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ON DRAINING.

Addressed to Young Farmers.

There is no one branch of practical farming which is more generally misunderstood or neglected in Virginia, than draining. The dryness of our climate, and the small proportion of our soils that are both level and of a retentive nature, cause this evil to be limited in its injurious effects, and to attract but little notice, compared to other defects in our husbandry. It may, and probably is the case, that many of our good farmers understand correctly the principles of draining wet lands, and execute the different requisite processes in an efficient and economical manner. But such cases are very rare in comparison to the many who are deficient both in theory and practice. It therefore seems to me, though not claiming to possess much knowledge on this subject, that even my imperfect views and experience may be serviceable to young farmers, and bad farmers—and let it be understood that my observations are designed for no others. Good farmers are requested to pass over the pages, of the Farmers' Register, which my desultory remarks may occupy, and to pardon the writer for so occupying them to their loss. Another apology may be due to my readers, for the unpolished form and manner of my writing: if so, I will make it now, and then be done with apologizing. In the first place, I have barely time to write even hastily and carelessly; secondly, my matter will not be of a kind to deserve much labor in embellishing; and lastly, perhaps with all the pains and care I could bestow, I should not make it appear much better.

Drains or ditches are required for three different purposes, as follows: 1st. For collecting and discharging sulplus rain water on land which is generally dry. 2d. For conveying streams. 3d. For collecting springs oozing from the hills, and diverting their course from the land below.

Ditches of the first kind, of which I shall now speak, are the easiest to make and keep in order, and are generally either omitted altogether, or made at double expense, to serve but half their purpose. A drain is required wherever there is a narrow depression of the surface of any land nearly level, in which the water of heavy rains collects and remains until it slowly passes off at the lower extremity, or soaks into the earth. Unless the loss of crop from such a cause is almost certain, and the space of an extent too great to lose, it is generally left to take its chance for a dry season, or gentle rains—by favor of which, the sink may sometimes remain dry enough through the summer. But usually, from excessive wetness, it costs double labor to till, and produces either a scanty crop, or none. When a ditch cannot be dispensed with it is commonly cut by the spade through the middle of the sink to its outlet, and the earth thrown on one or both sides of the ditch, in little separate hillocks, to let the water pass between them into the ditch. Every cleaning out of the ditch helps to convert these separate hillocks into a continued bank on both sides—and that end is still faster reached by the soil being turned towards the ditch by every ploughing, as horses do not (and cannot safely) cross such ditches with the plough. The trouble of stopping and turning the ploughs on reaching the ditch, and the margin thus lost or damaged on each side, amount to a serious disadvantage, even while the ditch serves properly as a drain to the adjacent ground: but in a few years that good is nearly or quite forfeited, by the margins of the ditch being so raised as to bank out the water, unless other means are used to prevent.

Nearly all the trouble and loss caused by this slovenly mode of ditching, may be avoided by using the *plough* in a proper manner to make and repair such drains. Mark off the middle of the sink, through its whole length, and with whatever crook its course may have. Then plough a "land," the sides of which shall be parallel to and equidistant from the middle of the sink, and of course on that line will fall the water furrow made by the finishing of the ploughing. The width of the "land" so ploughed may be from 10 to 30 yards wide as a shallow or deeper drain is wanting—and very often, a single deep ploughing, with a careful running of the last furrows, will serve to drain the sink as effectually as a new ditch cut by the spade. In this case, the work costs almost nothing—as the ploughing shou'd be given when the field is in the course of being broken up for a crop. If the mode of cultivation is in ridges crossing this drain, an additional ploughing of the same land should be given immediately, which will doubly deepen the water furrow for the drain. But if the field is kept under flat cultivation, or in wide beds, that additional ploughing will scarcely be needed, as the drain may be easily and conveniently kept open, by ploughing out a similar "land" whereever the field is broken up. Whatever may be the mode of cultivation, the ploughs will cross this drain without the least difficulty, and there will be no land lost to cultivation. The ditch will scarcely be observed (being merely a water furrow,) but in fact, the land on each side, after a few years, slopes gently towards it for 10 yards perhaps, so that it is actually a drain of 20 yards' width. The earth carried into the furrow by ploughs running across will scarcely fill it too much in the tillage of a crop of corn: but, if necessary, the earth so carried in is easily thrown out by shovels, and may be scattered over the widely sloped margins, without fear of raising a bank.

The poor level ridge lands, below the falls of our rivers, are full of shallow basins, which, though often dry in summer, are ponds of rain water all the winter and spring. These ponds are usually in a line along a wide shallow depression, descending towards one of its extremities. As the wetness of the earth, and the roots of trees (when the land is first cleared,) would forbid the effectual use of the plough in such places, a narrow ditch must be cut with spades, and brought from the lower outlet, through the middle of the line of ponds, so as to

draw off all the standing water. But as soon as the land is fit to receive good ploughing, (which will be by the beginning of the next course of crops,) a broad land as directed before should be marked off, taking the ditch as its middle, and ploughed out. The closing furrows will be probably as low as the bottom of the old ditch, and sweep away all appearance of it, and leave it passable by ploughs and carts, though more serviceable than when it was a barrier to the passage of both. In short, in all situations of this kind, the plough seems to efface the ditches, while it renders them most efficient. The superiority of these drains, in cheapness and efficiency, to those cut in the best manner by the spade, may be easily conceived, by supposing a piece of flat and wet soil to be thrown into wide and high beds with clean deep water furrows, in the usual manner, by the plough—and compared with similar lands ploughed level, and then divided into beds by narrow trenches being dug between with spades. Every piece of well bedded flat land has in every water furrow such a drain as I have recommended.

In bedded level land, there will be many slight depressions, which even when so shallow as to be scarcely perceptible, will hold water after heavy rains, and destroy the growth of winter crops. If the beds prevent the opening of drains across entirely by the plough, at least it may commence and forward the spade work for these places.—These *grips* (as such temporary drains are called) should be opened only a little deeper than the water furrows which cross them, as soon as the field is sowed in wheat. They may be quite effectual as drains, without being wide or deep enough to obstruct the future ploughing of the field.

The next kind of ditches are carriers of streams, and serve to drain the adjacent land by sinking the level of the streams in ordinary times, and more or less preventing its overflowing its margins, when swollen by rains. These ditches are required in almost every alluvial bottom, formed by, and subject to the inundations of streams passing through: unless the body of water is too great to be manageable by such means.

The streams in lower Virginia may be divided into two kinds: 1st. Such as have so little fall in their course, as to form *swamps*, by overflowing, or at least saturating with water all the lowgrounds during the winter and wet seasons, and thus making the land a worthless quagmire at all times. 2d. Such as have enough fall to leave the lowground firm and even dry, in ordinary times, except where injured by springs, or other water than that conveyed by the main stream.

The first class of streams are much the most important, on account of the many extensive bodies of swamp land which remain not only worthless, but nuisances, in several respects, and particularly as nurseries of disease; though no lands are richer, or could be brought into profitable use and cultivation, so easily and cheaply, compared to the great gain that would be obtained. Still, it will be unnecessary for me to treat on this branch of draining at length. In this point only, there is nothing to object to as faulty in the practice of individuals—for our laws (indirectly but effectually) forbid all such extensive drainings—and thus, our government shows a degree of negligence or stupidity—(it deserves no milder name—) which surpasses all of which evidence can be found in individual operations. When our country was first settled, it seems probable that these swamps were comparatively dry, and the streams unobstructed, except by the dams constructed by beavers. But every operation of our *civilized* population has served still more to raise, obstruct, and stagnate the waters. The only profit yet drawn from the swamps, has been by getting lumber from the large cypresses and other timber trees. In cutting down these trees, their tops are very often thrown into the course of the stream, where each serves to catch all the leaves and other floating rubbish, until it forms a dam, and raises, and often diverts the stream, to a new bed. The current is at no time sufficiently strong to remove such obstructions, although it may be spread over a flat of half a mile in width—and every one remains, until covered over with a deposite of mud. The law permits any land owner to add to these obstructions at his will—but (in effect) refuses the right to use the only means for bringing into profitable culture these great tracts of rich land, and of restoring health to the neighboring farms, which they now infect with bilious diseases.

Notwithstanding the great extent of overflowing waters on these flat swamps, the supply is much smaller than it appears, and they could be removed and kept within safe bounds by opening a canal from the outlet below, through the whole course of the swamp, as straight as the form and inclination of the land would permit: Level as such swamps are, there is plenty of fall for this purpose—and a ditch of 10 or 12 feet wide and 3 or 4 deep, would drain away the water which as now obstructed, inundates many thousands of acres. The expense of this central main carrier would be very inconsiderable, divided among all the owners of a large swamp; and when finished, nothing more would be wanting to make the land dry, except the small side drains to intercept the springs coming out of the highland, which each proprietor would dig for himself. The central canal being so nearly level might possibly be made also serviceable for winter navigation, by having temporary floodgates.

But cheap and profitable as such drainings would be, they are rendered impossible under our existing laws, because the concurrence of every individual owner of the swamp is necessary for the execution of the work. Blackwater Swamp (for example) is more than 60 miles long, including all its branches, and perhaps belongs to more than thrice as many individuals—and it is manifest, that from such a number, no such concurrence can possibly be expected, even if there were among them no minors, or life estate holders, neither of whom can legally concur. If by possibility, only a single proprietor opposed the scheme, while all the others were in favor of it, he alone might obstruct the execution. Nor is there any remedy to be soon expected. If three out of every four of the proprietors of any of these swamps were to be awakened to the importance and profit of such a general plan of drainage, (and I am sorry to confess that such is far from being the case,) and were to petition the assembly for powers to make it, and to compel all to bear their share of the cost, the proposition would excite violent objections, and perhaps intolerant and unappeasable enmity to the scheme. Every small lawyer, in and out of the legislature, would be furnished with a most conve-

nient theme. We should hear the plan denounced as an invasion of the "sacred rights of property," and the denunciation maintained by so many arguments (or what would pass for arguments) that the advocates would be glad to retreat from the wordy inundation. But as plausible as such arguments may be, precisely such might be urged against opening the existing, or any roads, through private property, if we can suppose such a case possible as the country being settled and cultivated, without having a public road within its limits. Roads are cut through private property without asking leave of the owner, and he is also taxed according to his property, to pay his share of the expense of construction. Sometimes it happens that the road for which a proprietor is so taxed in his landed rights, and on his purse, though beneficial to the public, is to him individually a source of inconvenience and of loss. Still these exceptions are properly considered as no objection to the general regulation, for the general good—and the lawyers raise no objections, because the policy is already sanctioned by *law*. But if all of lower Virginia had been one great swamp, held by thousands of individual proprietors, and which could be drained as easily as Chickahominy and Blackwater swamps now could be—according to our laws and to the arguments of lawyers, there would be no possible means, consistent with justice and the principles of our legal policy, by which this beneficial improvement could be effected.

But I have already said too much upon a branch of draining which was only intended at first to be named as a matter to be omitted. My purpose was to advise practical operations which each individual may perform—and I have allowed myself to digress (uselessly I fear.) upon what individual efforts are altogether forbidden.

Streams of the second class, having sufficient fall, are generally such as flow through a hilly country. The lowgrounds, or bottom lands, lying on the borders of such streams, form a large proportion of the best natural soils of lower Virginia. Indeed but few other soils are richer than these have been, or would be more productive, if they had been properly managed: but the general treatment of such lands has been so injudicious, that they have yielded but little net product, and in many cases have become nuisances, and a source of loss instead of profit. I allude especially to lowgrounds on small streams, not exceeding the size sufficient for an ordinary mill. Some of the usual and barbarous practices will be pointed out for avoidance, and also because their effects now present some of the worst obstructions to a proper plan for drainage and cultivation.

The bottoms through which the streams run, have been entirely formed during past ages by the earth washed from the higher lands by heavy floods from heavy rains, and deposited so as to form a nearly level surface. Of course the greater part of this deposite has been made from the main stream, and at the times when it overflowed the whole lowground. But it is not only during such floods that the operation is going on. At all times a shallow running stream is bringing down earth, and thus raising its own bed, until it leaves it for another and lower place, or when a flood comes, throws the accumulated sand out of its choked channel, over every place low enough to receive an accession. Thus, by the tendency of the overflowing water to cover mostly the lowest land, and from the greater subsidence of the suspended earth, where the water is most deep and still, nature works continually to keep such lands level from side to side. Before the adjacent hills were cleared and subjected to the plough, there could have been no great supply of earth, except from the richest soil on the surface—and that was furnished slowly and gradually.

Rich as these narrow bottoms were, our fathers did not readily undertake to drain and cultivate them. Before this was done, the adjacent highlands had in most cases been cleared, cultivated, and washed into gullies—and had served to throw upon the lowground more of barren subsoil in a year, than it had before received of rich mould in ten. Nor was this injurious deposite brought down by the principal stream, and spread over the whole surface. It mostly was brought by torrents of rain water, which for a little time swelled the rivulet to a flood, and by which the sand or gravel was carried out on the rich bottom soil, in points projecting from the ravine through which the torrent rushed. These points of sand, by their thickness and poverty, now form one of the greatest difficulties in draining and cultivating the lowgrounds.

The management of the neighboring highland, so far as its washing is promoted or prevented, is one of the most important things bearing on the alluvial bottom below. If no mischief had been already produced from this cause, the instructions that will be offered would be more simple, and yet far more serviceable. Prevention is always better than cure—and in these cases, the perfect cure is impossible. We have destroyed the greater part of the value of our low grounds, before we knew their productiveness.

Next come the injuries inflicted directly when such lands are under cultivation.

Bottoms of the kind under consideration are generally from 150 yards wide, to the narrowest size worth draining—meandering continually in their course,—and having sufficient fall or inclination to give a rapid course to the natural stream, and to allow the land to be effectually drained for cultivation. The stream is still more crooked than the valley through which it runs, and is often twice as long as would be the straightest course that might be given. Nor is the course of the stream always through the lowest part of the land—for the margins of the stream are often the highest parts, owing to the more plentiful deposite of sediment when the overflowing waters first rise over their banks. The first error usually committed is to leave the stream (if a large one) in its natural crooked bed, instead of giving it a shorter course: the next is, to impede still more the course of the water by allowing thickets of briers and shrubs to stand on the edge of the stream, and every kind of rubbish to be thrown into it. The crooked and choked channel causes the stream to overflow with a rain that would not swell the current injuriously, in a clean and straightened bed, though of no more average width, and occupying not one fourth as much land. The land lost is not only the bed and banks of the stream. A very crooked course makes it impossible for the plough to run in the same direction: and many points of land are formed too narrow to to be worth cultivation. Hence a wide margin is left to grow up in thickets, and to harbor musk-

rats and other vermin—or to be kept cleared at more than twice the cost of proper cultivation. If the stream separates the lands of two proprietors, (as is one of our common follies,) the evil is far worse. If either cleans his margin effectually, and opens the stream, it will avail but little, while his neighbor uses no such care. In the meantime, with every heavy rain the obstructed current sweeps across the land, tearing away the ploughed mould, or covering it with its load of sand. The soil thus swept off serves to fill and render useless the cross drains made to convey the smaller streams. Every such flood saturates the soil with water to the great damage of the crop, and leaves the whole a picture of desolation.

Next let us examine the side, and cross ditches. In hilly and sandy lands, small springs ooze out of the hills so frequently along the side of the low-ground, that there is almost always a necessity for a ditch on each side, to intercept them. The side ditches (unless they are covered or hollow drains, which will be treated of hereafter,) if bordered by cultivated land, are perpetually filling from the washing hillside soil; and the difficulty of keeping them open is still more increased, where they cross the points of sand brought down by former currents, and which are still increasing from every torrent of rain water. It is not strange, therefore, that the side ditches are seldom clean; and though they obstruct, they seldom entirely prevent the oozing waters finding their way to the lowground. Where the valley is narrow, or the main stream small, one of the side ditches is often made also the main carrier, or channel of the stream. This is a great saving, if the ditch is straight enough, and so situated in other respects as to be kept open, and deep: but otherwise, the side of the low-ground is the worst location for the main stream.

Cross ditches are used to bring the water of a side ditch to the main stream, when it can no longer be continued down the side; or they lead from low places which though not exposed to spring water, would be made ponds by receiving the surface water from rains and floods, and would remain so until the water was soaked up by the absorbent earth. The beds in which the land is cultivated usually lead to these cross ditches, and their water furrows there vent the water that collects in them. As the cross ditches fill rapidly from the causes already stated, their repeated cleanings soon make a dike not only on *one* side, but on *both*, unless more judgment is exercised than is common. Then the ditch, when well open, may draw water from its head to its outlet: but not a drop can enter it along its whole course, so well is it defended by the bank of earth on each side.

Now for the rotation and culture.

Lands of this kind seldom form but a small portion of a whole field, and are therefore not often put under a different rotation. Say that it is the common three shift rotation, or 1. corn—2. wheat—3. at rest. When the winter comes preceding the year for corn, the land has been two years without a ditch being cleaned out: and if grazed, the treading of cattle and rooting of hogs have been aiding greatly to fill them up. If not grazed, the richness and wet state of the land have made it a wilderness of weeds and rubbish growth of all kinds. In the latter case, ditching in autumn would be almost impossible; but even if kept bare enough by grazing, no farmer has leisure for a heavy job of ditching before winter. At all events, it is never done. The land treated as I have stated is almost as wet as if no draining had ever been done—nay, it is often much the wetter for the work miscalled draining. But little of wet ditching can be done in cold weather: so it is in March, before the old drains are opened. Still the land is very wet from having remained so long water soaked—and it is ploughed before it is dry enough, because the season is too much advanced to wait longer. Under such circumstances the land cannot produce near a full crop, even if the draining was then perfect, and continued effectual for the remainder of the year. During the following crop of wheat, the drains are filling, and seldom opened, and during the year of rest afterwards, the former water soaked condition of the land is completely brought back.

This picture does not in every particular apply to all such lands, even when most badly managed: but some of the traits will suit all, not excepting some in the hands of the best farmers: for in the management of lowground especially, we often want the means to perform what our judgment directs should be done. For example—who is there who does not pronounce, when ditching in March, that he ought to have done the work in September? and who is there who profits by his own opinion and experience, so as to avoid the same error in future?

I now proceed to propose plans for draining and cultivating soils of this kind, all of which I have tried with success to such extent as was permitted by the situation of the land in my possession, and the circumstances under which it was placed.

It will perhaps be more plain to apply instructions to a particular case of common occurrence, than to attempt to embrace every variety of circumstance and difficulty. For this purpose, suppose the land under consideration to vary from 100 to 150 yards wide, the alluvial formation of a stream strong enough to turn a common mill, and which flows through in a very crooked channel in ordinary, and commonly overflows the whole bottom with every very heavy rain, or perhaps two or three times a year. The average descent of the stream and the land, from six to fifteen feet in a mile. The soil a rich sandy loam. Subsoil various: sometimes layers of sand within reach of deep ploughing, sometimes of clay, and sometimes (though rarely) the rich black surface soil shows no change for several feet in depth. We suppose farther that the land has been cleared and cultivated long enough to give the plough generally a free passage.

Lowgrounds of the kind under consideration are in general more exposed to water from numerous springs oozing out of the adjoining highland, than from the main stream—and therefore the removal of the former first demands the farmer's care. But neither the side, central, or cross drains can be finished, before the other kinds are in progress—and it will suit my arrangement best to speak first of the ditch or carrier of the main stream. The side drains require most skill and care, and their consideration will hereafter be undertaken. For the present, let it be understood that the side and cross drains are in the usual imperfect state of operation, serving to permit the imperfect cultivation of the lowground.

The great object is to give the main stream the

shortest and best course through all the extent of low ground to be drained. With this view, the shape of the ground, and the force and size of the floods should be well considered, and the new course for the stream determined accordingly. In general, it will be cheapest to adhere nearly to the straightest course—which, in a crooked bottom, will cause the line to touch the projecting points of highland, first on one side, and then on the other. But desirable as are long straight stretches, we must take care to change their direction very gradually when a change is necessary. In a long straight course, with sufficient descent, the water acquires a force which enables it too keep its direction, in spite of considerable obstacles—and will rush across, and fill up with its deposite, any part of its channel which turns off at an angle, or with a short curve. To avoid this danger, it will be sometimes proper to begin a gentle curve before reaching the point where it would necessarily be made. There is another case in which straight courses should be departed from—that is, when with no great variation of direction, or increase of distance, the main carrier may be made to keep along the side of the low ground for a considerable distance, which will so far serve to avoid the trouble of another side drain, and also preserve the low ground in one unbroken body, at that place. But desirable as it certainly is to have the stream kept at the side of the low ground, it should not be done unless the location is good with a view to perfect drainage. A ditch at the junction of the low and highland, is far more subject to be filled with rubbish and earth brought by rains, than if in the body of low grounds—and, therefore, if so situated, its course must not be too crooked, nor the force of the current too small, to guard against that danger.

When the line from the ditch has been fixed, it should be marked off by stakes, wherever not plainly enough exhibited by some existing marks. It will be generally found that the line will divde the lowground into large pieces, shaped something like segments of circles, the straight sides of which will be the new line for the stream, and the curved sides made by the hollow bends of the inclosing high land. The new line will probably cross in many places the serpentine bed of the stream. The work should be commenced in the dry season, and on the driest parts of the land, if any are too wet for the operations required.

On a part of the new line, say from 50 to 200 yards in length, and extending from the old stream at one place of crossing, to another, lay off with a plough, well and deeply, a *land* of about 12 feet wide, the closing water furrow of which will be the centre of the intended canal. This width of ploughing will be sufficient, if a passage for the water six feet wide and $2\frac{1}{2}$ feet deep will serve: but the larger the canal is desired, the wider should be the ploughing. Such a stretch as is here spoken of, is supposed to pass through the body of lowground. As soon as the plough has cut a few furrows, laborers with broad hoes begin to draw out the loosened earth, and to deposite it, with very little regard to accuracy, on the land outside of the ploughing. When the plough has closed its work and formed a deep water furrow, it begins again and goes over the same land, whether the hoes have finished ahead or not. A third time the same operations may be repeated, or until the ditch is either nearly deep enough, or the bottom has become too miry for the horse to walk on. In this manner the greater part of the digging and removing of the earth may be done at a very small cost, compared to spade work. Still there remains something for the spades to finish. After the last ploughed earth has been drawn out, the ditch of the desired width (say 5 to 7 feet) should be accurately laid off by a line, and the stakes first set up to mark the course. A single spade's depth will generally give sufficient depth, and the work will be very easy to perform. There is no need, generally, of digging low enough to divert at once the stream to the new course. It will be sure to take the new and straighter course at every rise of water, and will naturally deepen the new, and at the same time be filling up the old channel. This operation may be hastened by opening well the upper end of the new channel at each crossing place, and obstructing somewhat the old passage just below, by the top of a tree or other rubbish, which, though serving to impede the floods, will not prevent the passage of the stream in common times. It would be improper to stop the water entirely from its own channel, as that would prevent its being filled up, and it would remain in the way of cultivation. But if a current has choice of two channels, united above and below, the one straight, and the other crooked and twice as long, the effect will certainly be, sooner or later, to deepen and enlarge the first, and to deposite its mud and sand in its slower passage through the second, until it is entirely filled. It is much cheaper to let nature thus aid your draining operations, than to dig the carrier at once as deep as desirable.

When the first rough part of the excavation, by ploughs and hoes, is finished through one stretch, it may be begun on some other—either adjoining, or distant, as may be most convenient. As the old channel for a long time will continue to convey the stream, it serves to keep the new work in different dry sections, to be opened as may be convenient. Adjoining sections should be connected as soon as possible (and by the spade if necessary) so as to have the benefit of any flood of rain that may occur.

When the main carrier is intended to be made for some distance along the margin of the highland, the earth must be thrown by the plough altogether towards the lowland. For this purpose it will be cheapest to use a hillside plough, which, by shifting the mould-board, turns the furrow slice to the same side, whether going up or down. If a common plough is used for such places, it must cut only when driven down the course of the valley, and be dragged back empty, to begin another furrow, at the upper end of the stretch.

If the owners of low grounds would act according to their true interest, this plan would be extended as far as the nature of the land required it, without regard to who might be the owner of any particular spot. Then each proprietor would be benefited by the drainage of the land below, serving as an outlet or vent for his own. But that is not now to be counted on, and each person must expect his drains to end with the lower termination of his land. If there is much fall in the stream at that place, the injury from this stoppage will not be considerable, except perhaps to the next land below. There the water increased trebly in velocity by its clear passage above, and finding no

straight or sufficient channel below, will probably rush over the land, and expose it to all the damage which the owner will well deserve to sustain. If, on the contrary, the fall is inconsiderable, as in the swamps before described, the lower landholder could render ineffectual the draining of the land just above. In such cases a good vent to the water below is highly important, and the want of it may destroy half the benefit which might be derived from the whole drainage.

When streams are thus straightened, and their sides kept clean and smooth, they will carry off quantities of water that could not be kept within the former stream, even if four or five times the superficial extent. But I do not mean that inundations will be altogether avoided, though they will be comparatively rare—and when they occur will be of short continuance.

But there is an objection (and unfortunately a very general one) to all such schemes of drainage. Streams are generally made to serve as dividing lines between different properties, and that circumstance alone is sufficient in most cases to prohibit any rational scheme of drainage. When lands were first taken up under the old patents, and sold out without accurate surveying, a stream was a very convenient land mark, because it could not easily be changed or mistaken. But for the drainage and proper cultivation of the lowground, the stream is the worst dividing line that could be fixed upon. All my foregoing directions on this subject must rest on the supposition that one person owns both sides of the stream—or that the different owners are willing to concur in the best general plan of drainage, and in the exchange of points of land cut off by the new carrier of the water. Either of these cases is so rare, that I must agree that the directions I have written are almost useless, and an unprofitable waste of the time of my readers, as well as my own. However, should I find that any value is attached to my suggestions, I may resume and finish my observations, as at first designed. It remains to treat of side drains, open or covered, intended to intercept springs having their sources in the highlands.

R. N.

A GLANCE AT EXISTING ESTABLISHMENTS FOR AGRICULTURAL INSTRUCTION.

Translated for the Farmers' Register from the Journal d'Agriculture des Pays Bas.

At no epoch of modern times have all the advantages which agriculture procures been as well understood as now. After thirty years of revolution and of war, this science, whose practice, so innocent and delightful, calms the ardor of ambition, preserves the serenity of the soul, and has always been the cherished occupation of the wise, receives at last real encouragements from most governments. Among those who are distinguished, we ought to mention that of Wurtemburg and that of Bavaria. In the first of these states, agriculture and horticulture make a part of primary instruction. In this small kingdom, whose population does not exceed 1,500,000, there are more than three hundred and fifty schools in which these sciences are taught.

In Bavaria, the king and queen have taken under their special protection all the establishments in which agriculture is taught. This protection is not limited, as in many other countries, to useless and sterile encouragements; there these establishments are richly endowed by the bounty of the government: premiums offered, and often distributed by the king himself. This homage rendered to the first of arts, and these encouragements decreed to those who profess them, do honor at once to the sovereign who grants them, and to the modest and interesting class of subjects which receive them.

For some years the government of France has made great sacrifices to perfect the agriculture of that vast kingdom, which possesses already many establishments which may be cited as models in the best cultivated countries. They exercise a happy influence on the agriculture and rural economy of the country.

In the farm of Rambouillet, they put in practice the best agricultural processes. This establishment is distinguished above all for the finest breed of domestic animals useful in agriculture. Not far from these, the domain of Grignon, of the value of more than a million of francs, paid from the royal treasure, has been turned into a vast agricultural establishment, intended to serve as a model, and to train scholars. This will be, without doubt, one of the monuments which will do most honor to the reign of Charles X.

To mention the establishment of Roville, near Nancy, due to the celebrated Mathieu de Dombasle, who directs it with so much success, is to indicate the utmost perfection to which practice, enlightened by sound theory, may be brought.

M. de Dombasle (son of the one mentioned above,) has founded a short time since, a farm near Angers, like that of Roville. No one can doubt the complete success of this establishment which will be a true benefit to the country.

Near Nantes, a Belgian agriculturist is conducting a farm according to the Flemish system, with great success.

An English farmer, protected by the government, has just founded an agricultural establishment in Normandy. He makes use of improved ploughs, which he has imported from England.

In Berry, the Count de Gourey is occupied with forming an agricultural establishment after the Flemish method. He has brought from Belgium ploughs, ploughmen and teams, with which he succeeds well.

One might yet mention the agricultural establishments of Copet, near Geneva; that of the Duke Decazes, near Libourne; of M. de Pradt, in Auvergne; of General Lafayette, at La Grange, (Department of Seine and Marne,) and many others, which are equally interesting by the superiority of the processes which they employ for the execution of their works.

Switzerland and Germany also offer many agricultural establishments deserving notice: among others, that of Hofwyl, near Berne, founded and directed by M. de Fellenberg. All parts of what is properly called agriculture, of rural economy, and whatever relates to the improvement of agricultural implements, are taught there with much success. This celebrated institution receives scholars from all parts of the old and new world.

Near Hamburg, the Baron de Vosht directs a very remarkable agricultural establishment; it is

a source of light which exercises a happy influence on the agriculture of the north of Germany.

England, so jealous of her superiority, knows too well all what industry owes to agriculture, to neglect any thing that can favor and encourage this art; thus is it carried in this country to a very high degree of perfection. Rural economy, especially the raising and improving the races of domestic animals, leaves nothing to be desired in England, where one can draw up the best precepts on this important branch of public riches.

Although Belgium justly holds the first rank among all the agricultural countries, and all of our farms may be considered as so many models, it is not less desirable to see founded a normal establishment, theoretical and practical, devoted to the improvement of all the parts of agriculture and of rural economy, and where the pupils might obtain and put in practice the best precepts on different branches of the agricultural and economical science which they might then spread in all parts of the kingdom. Let us hope that the government will supply this need of our time, and that it will do for agriculture what it is doing for the mechanic arts, in instituting at Brussels gratuitous courses of geometry, theoretical mechanics, chemistry, &c. applied to the arts, and especially designed for the instruction of the laboring classes.

PREPARATION OF SEED WHEAT.

To the Editor of the Farmers' Register.

I have been somewhat amused at the discussion in the Register, concerning the production of *cheat:* one party contending, that it is a distinct species of grain, which, by no process whatever, can be produced from any other grain; the other party contending, with equal earnestness, that it is produced from degenerated wheat; and one gentleman goes so far as to assert, that it is incapable of reproduction beyond one course of generation. Both parties claim to have proved their respective theories by actual experiment. I shall not undertake to act as umpire between them, but will inform them of the manner in which I have for a number of years prepared my seed wheat, which cleanses it effectually from the light and defective grains of wheat, from cheat and from garlic. If the theories of either party be correct, or of both parties partially so, my process will prevent the evil arising from the propagation of cheat, so far as it can be guarded against by purifying the seed wheat.

When I am about to commence seeding, I have two barrels prepared, one of which I have filled about two-thirds full with brine, strong enough to bear an egg, into which I have the seed poured very slowly, until the brine rises nearly to the top, which will be covered with the light grains of wheat, cheat and garlic, which are skimmed off with the hands, and the wheat at the bottom stirred once or twice to free it of any remaining impurities, which are again skimmed off. An old basket without a handle is then placed on the top of the empty barrel, through which the brine is poured from the wheat by two men taking the full barrel by its bottom, on opposite sides. The wheat is then emptied into a large box, and the same process repeated from one barrel to the other alternately, until a sufficient quantity is washed for the day's seeding, and as much gypsum is then stirred into the whole mass, as will adhere to the grain. Water is added occasionally, and a sufficiency of salt to maintain the strength of the brine, which is tested by an egg kept at hand for the purpose. The whole process is completed in the morning, by the time the teams are ready to proceed to their work. I suppose a bushel of salt would probably suffice for one hundred bushels of seed, which would, by reason of its invigorating qualities, be very well bestowed in that way, independently of its aid in freeing the wheat from its impurities. F. H.

N. B.—If the wheat is infected with smut, it will be effectually destroyed, by stirring in a portion of quick-lime before the gypsum.

SARRASIN—BUCKWHEAT.

Translated for the Farmers' Register, from the "*Cours Complet d'Agriculture, etc. par l'Abbe Rozier et autres.*"

This grain, improperly called *black corn*, (since it does not belong to the gramineous family,) has borne different names more or less approved. Oliver de Serres designates it by the names of *millet-sarrasin*, and *bucail;* elsewhere it has been named *bouquet* or *bouquette*, doubtless on account of its abundant and durable flowers, which resemble nosegays [bouquets.*] It appears, that being brought into Europe by the Moors [Sarrasins] of Spain, this grain borrowed their name; but that it was not cultivated until the commencement of the sixteenth century—in France about 1520, and in England about 1590. As to the species brought from the north of Europe, it was introduced in Belgium towards 1570.

The grain of buckwheat is of a triangular shape, and blackish color; its skin is easily broken, is bitter and very disagreeable; it covers a very white meal, to which it adheres but slightly, and from which the skin ought to be completely separated, or it will be injured both in taste and color.

Buckwheat grows on almost every kind of soil; but it prefers such as are light, and not moist, as well as situations sheltered from the exhalations of marshes, and from the north and north-east winds. Buckwheat does not occupy the land but from three to four months: it yields heavily in good years; it stifles weeds, and cleans the soil on which it has been sown: it offers, if turned in green in a proper manner, an excellent manure; its flour gives to men a very nourishing pottage, and to poultry a dough which makes them fatten well and quickly. But how many objections also present themselves with these advantages? Buckwheat offers always a very precarious harvest. As it is not sown until in May, or even June, if the weather is dry, as often happens at that time, it does not come up; if frost comes, the growing plant perishes at once. Grown to a good size it still is endangered by drought, because it does not branch well, and cover the ground; in flower, it is still more delicate, and the mists, frosts, heat of the sun, rains, (but not the *stars*, whatever may be said of them,) destroy the fecundating power of the *stamens*, and render the plant entirely barren. Its bread is extremely indigestible, and of a disagreeable flavor; it is even difficult to make bread of the meal; it cannot be used but when

* This is an amusing example of the derivation of names: *buckwheat* is evidently a corrupted English pronunciation of the French name *bouquet*.—[*Translator.*

newly ground; the common mills are not fit to extract it from the grain, which requires only to be rubbed to rid the meal of the very tender bran which encloses it. The culture of buckwheat is laborious; it demands a soil well pulverized, worked carefully, and improved by leached ashes, dry dung, or night soil, [poudrette,] burnt litter, and rich mould; in many cantons, they are forced to pare and burn the turf, and to spread the ashes on the soil—a pernicious operation, which, being commonly adopted on lands already dry and friable, acts by removing their adhesive quality, and finishes by exhausting them entirely. Sully, who was acquainted with all the inconveniences of this culture, and knew doubtless how precarious is the crop of buckwheat, which, to speak properly, gives a full harvest scarcely once in five or six years, wished to proscribe this grain, which indeed, does not succeed, whatever may be said of it, but in soils from which we might with more advantage obtain wheat, or some other *cereal* grain, more useful, and which would serve better for our wants.

It should be observed that buckwheat weighs from five to six *kilogrammes* (10 to 12 lbs.) the *decalitre* (10 pints,) of which the price is 1 *decime*, (tenth of a franc) the *kilogramme*, which sells commonly one-half less than rye, and that it returns also (all quantities being equal,) one-half less bread.

Rozier states that we may sow buckwheat at two periods, according to circumstances, or rather, to the climate—either in May, if late frosts are but little feared, or otherwise, after the harvest of wheat and rye. This last plan, which may suit in the southern departments, is not admissible in the other parts of France, since there the wheat and rye harvest has not generally ended but during the month of August, a period at which it would be impossible to sow buckwheat, which requiring four months to remain on the land, would not ripen before December, or rather, would not ripen at all, the frost of October being sufficient to destroy it.*

The land that is to receive buckwheat should be ploughed with care, put in good tilth, and (if not already fertile,) improved either by ashes, dried night soil, or with the dregs of the dung pit; or it is still better to use turf and heath reduced to ashes. Buckwheat requires two-thirds less of seed than rye and wheat. If the season is a little rainy and the earth newly ploughed, the seed will come up quickly and soon cover the earth, in which it ought to be lightly covered by means of the harrow, or by rakes. It is sowed in beds, or in very wide "lands," in order to make the most of the soil, which has no need (as for winter grain) of ridges and water furrows, since buckwheat does not occupy the land but about a hundred days of the warmest part of the year.

As this plant is easily hurt by cold dry winds, and by frosts which may occur at the time of its flowering, some farmers have thought of raising along the windward side small heaps of half dried grass, which they cover with a little earth, and set on fire; the wind carries the smoke over the surface of the field, and prevents the effects of the cold which would freeze the stamina of the flowers, and cause them to perish.

As soon as three-fourths of the seed are dry, black, and consequently ripe, although the top of the plant may be still in blossom, it is time to reap the crop. If we wait later, part of the grain, detached from the stalk, would fall on the ground and be lost; even in making the harvest at the time indicated there is still a considerable loss. In order that it may be the less, we should choose the time for reaping buckwheat when the dew, or a light drizzling rain, keeps the seeds in their places. Much heat makes buckwheat shatter rapidly; and is not desirable, except to dry it, and to finish ripening it, when it has been put immediately in sheaves, which are tied around their tops, and made to stand up by spreading the base, so as to manage them the better and make them dry more quickly. To avoid the loss that shattering occasions, some prefer pulling buckwheat by hand, which shakes it but little, to mowing, which shakes it too much.

A few days of sunshine suffice to complete the maturing of the grain and the drying of stems. As soon as this time arrives, an area is cleared, and with the flail, like other kinds of grain, the buckwheat is beaten out. It is prudent not to winnow it immediately: this grain is apt to heat and be injured in the granary, when its chaff is not retained with it. It is spread and stirred every fifteen days to air it; and fanned when it is wanted for use. It should not be ground but when the flour is wanted.

As after the reaping and beating out, there remain on the earth many seed (and these are always the best and most perfectly filled,) it is proper to lead to those places the fowls of the farm, which find an abundance of this food, of which they are very fond. We may estimate the loss which this crop sustains from shattering at one fifteenth.

In good years buckwheat may return a hundred grains for one; it would be an excellent product if these good years were frequent; but unfortunately they are rare, and, as we have said above, they do not return at the oftenest, but once in five or six years. I have seen many consecutive years during which the crop not only has not defrayed the expense of culture, but even has not brought a single stalk.

Independently of the nourishment that buckwheat provides for hogs, and especially for fowls, to which it gives quickly a delicate fat, it serves to support men when they have no better grain for food. However, it is wrong to make the meal into bread, either alone, or in combination with other kinds of meal; what is obtained is only an insipid, indigestible mass, and even still more injurious, if it is true, as Cabanis assures us, and as we can scarcely doubt, that it occasions "an almost absolute defect of intelligence, a singular slowness in determination and movement." He adds that "men are the more stupid and sluggish, according as they live exclusively on this food." M. Parmentier, who has so much improved cookery, and even agri-

* This shows an important difference in favor of the climate of Virginia for the culture of buckwheat, whether made for green manure, or as a crop for sale. Its growth is so much more rapid under our more fervid sun, that it may be sown and ripened, not only after wheat, but after the main growth of Indian corn, by sowing the buckwheat with the last ploughing of that crop. This rapidity of growth makes buckwheat particularly well suited to form part of a rotation of double crops—if, indeed, its culture is in other respects more profitable than other plants, either for grain or for manure—which is, at least, very questionable.—[*Translator*.

culture, has clearly proved that buckwheat is not fit to make bread alone, nor to be mixed with other kinds of meal, susceptible of fermentation. In the countries then, in which they obstinately cultivate this plant for food for man, they should limit its use to the making of pottage, for which it has been observed, that skimmed milk suits better than new. When cold, this pottage becomes compact, and cut into slices is good fried or boiled. They also make with the meal of buckwheat batter-cakes, which are baked on a plate of iron lightly buttered. These cakes are the better, and easier to digest, for being mixed with eggs well beaten with skimmed milk, and for being well cooked. When spread with fresh butter, and sprinkled with fine salt, they are very agreeable, and are, in some countries, the object of very gay country parties.

When buckwheat is intended for poultry, it should be boiled to swell it, and partially break the cover of the grain. Coarsely ground and mixed with barley, it forms a nourishing and stimulating food for horses and other animals of the farm. Cut green, it gives milk to the cows; it is preferable still, if it has been sowed with vetches and peas, to cure the mixed forage into hay.

The straw of buckwheat furnishes but little litter, and horses eat it only moderately; but there may be drawn from its ashes a potash very valuable for the composition of glass.

We have yet to consider buckwheat as a manure, and when so used, it may become of the greatest utility. It makes, in a short time, excellent muck, which being decomposed rapidly, is very suitable for land intended for rye or wheat. It is at once convenient and cheap; it is proved that 80 pounds of seed, of which the price is about 4 francs, can sufficiently improve 2 acres. This manure is very precious, especially for countries where dung is scarce, and where the lands require vegetable substances more than animal or mineral manures. To arrive at the end proposed, they plough in April, give a second ploughing at the end of May, and after putting the ground in good tilth, sow the buckwheat in the usual manner. At the end of two or two and a half months, that is to say when it has arrived at its full size, and would do no more except to dry in ripening, it is buried by the plough. Well covered in the earth, it quickly begins to ferment, and is soon reduced. We may almost immediately in warm countries, sow buckwheat a second time, which is then allowed to ripen; and in colder countries, the better course is to use this manuring as a preparation for winter grain. It is easy to demonstrate that this improvement, valuable in all respects, costs much less than farm-yard manure, and in the proportion of one to eight. It appears that this important discovery is due to the illustrious La Chalotais. We read what follows in the *Observations* of the Agricultural Society of Brittany: "When buckwheat is in flower, they cover it by a ploughing: a few days after, it is common to see a thick vapor like the mists that rise from marshes." It results from this manure, which in truth is less lasting than the others, but which is also much cheaper; that we may spare soil the abuse of naked fallows, procure a good manure without the cost of carriage, rapidly clean the soil of weeds, and make up in certain cantons for the scarcity of materials for enriching the lands.

[The mills used in France for grinding other grains, are unsuitable for buckwheat, and several plans and descriptions of mills are given for grinding buckwheat, without preventing the separation of the bitter bran from the flour. These are unnecessary to copy, both on account of the expense of the plates, and the fact of mill machinery and operations being now superior in the United States to those of France, at the time of the publication of Rozier's *Cours Complet*.]

Besides the common buckwheat of which we have spoken, there is a species considered preferable, which is known by the name of buckwheat of *Tartary*, or of *Siberia*, and which was in 1782 much extolled by M. Martin. This variety which has been brought from Siberia by a missionary of Low Maine, is especially suitable to the north of France: it is more hardy than the common kind; it is less inclined to lodge, and produces more. The grain is smaller, the stalk more yellow, and more solid. According to M. Curant, who calls this grain *Martin-Corn*, (in honor of M. Martin, of whom we have spoken,) the Siberian buckwheat fears neither hot winds, nor white frosts; it gives for one seed sown, nearly two thousand in rich soils—and elsewhere, from fifty to three hundred and more; it makes a better meal, and can be kept as well and as long as that from wheat. These incontestable advantages are accompanied by some inconveniences: in the first place, the Siberian buckwheat shatters in reaping still more easily than the common, and consequently demands an increase of precautions; then it grinds almost as slowly as rye, and it ought not to be sowed until July, a time when the hay harvest draws so heavily on the labor of the farmer.

That nothing may be suffered from the bitterness which this grain might have, if the bran is mixed with the meal, M. Turmelin teaches the following process, by means of which the meal is perfectly separated from the skin which encloses it: "The upper millstone is raised so that the grain may be only rubbed, and the skins be thrown whole, with the meal, into the receptacle, such as corn appears in the granary, after the ravages of mice. We should not be surprised if many of these skins are full of pulverized meal, which however will be completely separated by the shaking of the sieve: then we will have a pure, good, and well flavored flour, without bitterness, very dry, and for that reason, taking much more water than the common buckwheat flour, which constitutes the superiority of its quality."

M. Turmelin, who resided near St. Brieux, assures us that he has obtained two crops of Siberian buckwheat in the same year. He had at first sowed in March, and reaped at the end of June; then, on the same ground, sowed again in July, and reaped in the last days of October. This variety ought to be sowed thinner by one third than the common buckwheat: its straw is not fit to serve as forage for cattle, but however may be used for their litter.

A third variety of buckwheat deserves also to be cultivated: it is that which is designated by the name of *emarginatum*. It grows as high as the foregoing kinds, produces abundantly, and ripens early.

M. Parmentier cites still other varieties of Siberian buckwheat, which are cultivated in Sweden; and among others, a kind from Finland more forward than the others, more hardy, whic

has the advantage of being more tenacious of life, and of being able to multiply both by transplanting and by its suckers. It grows, says that excellent agriculturist, in Daourie, at the extremity of Siberia, near Chinese Tartary, in a mountainous country.

Such are the most important details into which we may enter, and which ought not to be overlooked when the business is to pronounce on the character and worth of a plant, from which so many thousands of men and beasts draw their sustenance, and which is accompanied by many objections, as well as by considerable advantages.

GLEANINGS IN NATURAL HISTORY.

To the Editor of the Farmers' Register.

I recollect about a year ago, to have read with great pleasure, as well as, I trust, considerable improvement, a little work entitled "*White's Natural History of Selborne ;*" and have recently met with another production of the same kind, styled "*Gleanings in Natural History, with hints for an Angler, by Edward Jesse, Esq.*" from which I have also derived so much gratification, that with your permission, I will venture to recommend them to the notice of your readers as striking instances of how much may be done by a little trouble and system towards increasing the general stock of knowledge, and thus becoming benefactors to mankind. If such a habit as the above authors pursued, I mean a habit "of *paying attention to the districts in which they reside, and publishing their thoughts respecting the objects that surround them,*" were followed up by our country residents generally, incalculable good would ensue; and we should, in that case, seldom again hear the complaint that has so repeatedly come across my ear, that rural life in Virginia is a life of extreme dulness and wearisome monotony. You too, Mr. Editor, would undoubtedly find the adoption of such a plan by our agriculturists of no small aid to you in the important work you are now so ably engaged in.

I send you Jesse's book, in order that you may examine it for yourself, and if you see fit, give an extract therefrom, as a further means of drawing attention to the work. Both together cost about a dollar and a half only. S.

[We thank our correspondent for his suggestions, and hope that our publication may be benefited by them, not only by such selections as he recommends, but by similar original matter, which many of our readers can aid in furnishing. Both the authors referred to, and also our countryman Godman, in his *Rambles of a Naturalist*, have proved that such details of the habits of the most common animals, presented in a familiar style and unpretending manner, excite a degree of interest in the reader, which would not be produced by the most studied and ambitious literary work. Nor would such studies and notices serve merely to give pleasure to the readers of an agricultural journal. There are but few if any of the numerous small animals which people our earth and air, which are not more or less either injurious or friendly to the farmer's labors: and yet without some knowledge of their habits, we can neither repel the evils that some inflict, nor profit by the service that others offer—and indeed, from ignorance we often mistake our friends for our enemies. It is probably not an exaggerated estimate, to suppose that a want of knowledge of the habits of some one hurtful insect, and of such other animals as would if permitted have destroyed it for food, may have cost the farmers of the United States many thousands of dollars.]

SOME REMARKS ON FARMING AND GRAZING IN LOWER VIRGINIA.

To the Editor of the Farmers' Register.

Having recently landed in this country, a number of your valuable Register was put into my hands, and as its pages are destined for the reception of any thing tending to promote agricultural improvement, if the following remarks collected during a short and hasty tour through a part of the country in this neighborhood, be considered of any importance, they are at your service, as they may throw out a useful hint or two for the benefit of planters in general.

Along the greater part of my tour, I was particularly surprised at the almost universal and luxurious growth of weeds on all pasture fields, or fields in grass; and my surprise was not lessened to find that the system of agriculture adopted in this part of the country favored such a growth of weeds, it being considered highly advantageous to the soil; and under that impression they are allowed to increase and flourish unmolested until the ground is again about to be broken up for a corn crop, when they are cut down and burned. I am very far from considering such a system as being otherwise than highly detrimental and exhausting to a soil. Such a luxuriant growth of weeds as generally grow on the low lands of Gloucester county and similar soils, must have an exhausting tendency, and the benefit which they are supposed to impart by preventing the heat of the sun from causing too great an evaporation, is much more than counterbalanced by the quantity of vegetable food extracted from the soil in their growth; and as they are allowed to grow, ripen and die every year, a very small portion if any of such vegetable food again returns to the soil. In highly improved districts of country in England, Scotland, and also in the States, it is the care of every farmer to clear his farm as much as possible from such weeds. The method usually adopted is to cut these weeds previous to their ripening or getting into seed, collecting them into heaps, when they soon form an excellent manure, and are again applied to the soil with benefit; allow weeds to grow along the fence lines of a farm, and it is impossible to keep a farm free from them, as winged seeds are easily carried by the wind, and soon cover hundreds of acres. Cattle in such pastures must suffer severely from the number of flies harbored in such thickets: and in such fields as I have seen, it was difficult for cows and other bestial at pasture to get to the clover and other grasses of shorter growth. It is a complaint among farmers here that it is impossible to get their land so well prepared for the reception of wheat and other grain crops as they could wish, from the quantity of roots contained in the soil. Let them adopt the simple mode of cutting these weeds before getting to seed, and in a few years, with careful manage-

ment, their farms would become comparatively free from such a nuisance. Observing the pastures in such a condition, I felt anxious to learn what profit they derived from their cows and the general mode of management. On one farm in Gloucester county of nearly two thousand acres, and having upwards of thirty cows, the greatest quantity of butter made in any one week was sixty two pounds, and the whole amount of produce from these cows from the month of April down to this time was only $152 00, a sum by no means adequate to defray the expense of attending to them. The plan here adopted, is to allow the cows to pasture over a space of nearly six hundred acres, covered higher than themselves with weeds of various sorts. Before sunset, they are collected and enclosed into a pen for milking, and are allowed to remain there over night, until milked next morning, without any fodder. It is impossible for cows to thrive under such treatment. Would it not be a much better plan to confine the cows to a smaller range of pasture, and shift them from one pasture to another once a week or oftener, and instead of penning them up all night without food, to turn them out to pasture? It is impossible for cows in warm and sultry days, and in a climate such as this, to gather more than a bare subsistence throughout the day, when teased with numberless flies, and generally flocking together for the shelter of trees or bushes. It would be a much better plan to place cows into a well ventilated house during the heat of the day, supplying them with a quantity of grass and clover cut from some of the fields, and allowed to be a little deadened before being given. To haul a little earth sprinkled on the floor of the cow house is considered beneficial for cows. The expense of such an additional attendance on cows would be more than recompensed by an increase of dairy produce. On farms of a good size there are in general one or more old or infirm persons who could attend to the cows, and who are unfit for almost any other work. The greater part of their work would be to clean out the manure daily, and supply the grass—in which case, cows would soon learn to assemble to the sound of a horn, and thus give very little trouble.

A. N.

Norfolk, 28th Oct. 1833.

[The foregoing letter is from a practical Scotch farmer, whose remarks we shall be glad to receive, whether made on the husbandry of Virginia, or of Scotland. It is always desirable to compare opposite opinions, and by that means, instruction may often be drawn from those whose previous habits, and the circumstances under which they have been placed, are the most unlike our own. The "enclosing" system, as it was called by its great advocate and introducer, the justly venerated John Taylor, which by forbidding grazing, allows fields to manure themselves slowly by the decay of their own vegetable cover, must seem as improper as it is strange, to a farmer coming from high priced and highly cultivated lands. Nevertheless, where labor is high, and but little profit is to be obtained from grazing, and especially on poor, but improvable soils, the enclosing, or non-grazing plan, is the cheapest and best means of giving putrescent matter to improve the land. But this plan, even when properly carried through, is not suitable to every field—and still less do we defend such practices as our correspondent describes, which by attempting to obtain profit both from feeding cattle and improving the soil by the weeds they leave, in fact serve to lose both the benefits expected. If a farmer is obliged to burn off the weeds before breaking up his field for cultivation, it proves either that his ploughing is very badly executed—or otherwise, that his soil is so rich, that clover ought to have taken the place of weeds.]

For the Farmers' Register.

A PLAN PROPOSED FOR A CHEAP AND DURABLE RAIL ROAD.

In passing the streets of Williamsburg, I notice before many gentlemen's doors a very hard and even cement, and I recollect that a few years ago, they had put marl, or fossil shells there, which is the only ingredient. Query—Would not the same material, after levelling a track, by being spread from four to six inches thick, serve as well or better for a road, than wood and iron as used for rail roads? If the wheels were made of cypress or pine of suitable size, and like a roller four our five feet long, fixed fast on an axletree of wrought iron, (so that the axle would turn with the wheel, one wheel would answer instead of two, and the pressure or weight being on a broad surface, would serve to keep the track smooth and even—especially if carried by steam power instead of horses. I see no reason why a road so made and used, would not last for ever, with very slight repairs.

The contemplated road from Richmond to Yorktown would run through a country that abounds with the above named material. My impression is that a road might be made on this plan, for half the usual cost. The question now arises, would such broad wheels run as easy as narrow? Experience would test this—but I think there would be little or no difference, as weight *is weight*, whether it rests on a *tread* of five inches, or five feet. The main thing in doubt, is whether the marl could be made as smooth as an iron rail road. I think a portion of sand might be added to the marl, with advantage. I submit these remarks for the consideration and judgment of the public.

PARKE JONES.

James City Co. Oct. 27th, 1833.

ON THE CULTIVATION OF CORN.

To the Editor of the Farmers' Register.

Upper Brandon, Prince George, Nov. 1, 1833.

Fully convinced as I am that much more labor than necessary is usually expended on the culture of the corn crop, I yet offer the following remarks on that subject with great diffidence. Early and deep fallowing, particularly on stiff soils, is deemed essential, even where a second ploughing is rendered necessary by the application of manure in the spring. In every process on my farm it is my object to substitute as far as practicable the use of horse power for manual labor; and in subservience to this rule, after the whole surface has been previously well harrowed in the spring, my corn land is all laid off in checks, where the land is dry enough to admit of this sort of culture. With a view to the same object (the saving of manual la-

bor,) a greater distance is allowed, and two stalks are left in a station where the strength of the land is sufficient to bear it. This you observe greatly diminishes the hoe work. We use seed without stint, dropping from six to eight grains in a place where one stalk is to be left, and from ten to twelve where we design to have two. The object is to insure an even crop. We use a variety of small ploughs; but infinitely more depends on the execution of the work that on the kind of plough used. There should always, however, be a due relation between the size of the implements used and the width of the rows, in order that the whole work may be completed at a given number of bouts, without ploughing any part of the row twice. We deem it all important to start the small ploughs early (soon after the corn is well up,) ploughing deep and close to the plants, and endeavoring to get over the whole field once in 14 days till harvest. During that busy season we keep about half the usual number of ploughs at work. Some of my neighbors have frequently hoed over their entire crops before I begin to weed at all—an operation that at that early period I verily believe rather retards than forwards the growth of the young and tender plants; nor am I singular in that opinion. If I can barely get over with the hoes before harvest, and that rather imperfectly as most farmers would pronounce, I am perfectly satisfied. Immediately after harvest we keep all our ploughs running for five or six days; and at the same time, we weed out the most grassy spots with the hoes. We then commence thrashing wheat, and leave about half the ploughs to lay by the corn, which they do by ploughing every other row to diminish the risk of firing. When the field has been gone over in this way, they return and finish the rows that have been left. As soon as the crop of wheat is thrashed, the hoe hands return to the corn field and destroy the young grass: this is done to expedite the seeding of wheat. Under this system, we are enabled to deliver most of our wheat in July, when according to the old plan, we hardly ever commenced thrashing till about the 1st of August. The advantages of an early delivery of wheat must be obvious to every farmer. The quantity is greater, the quality improved, and the price enhanced, as well for these reasons, as because the miller is anxious to get wheat in order to commence grinding at that early season. In fine, I will not say that quite as much corn can be made in this way as with more hoe work, though I am by no means convinced to the contrary; but I do say, that the increase, if any, would not compensate me for the extra labor at that busy season of the year.

WM. B. HARRISON.

For the Farmers' Register.

COMPARATIVE EFFECTS OF LIME AND MARL—BURNT CLAY.

The two following experiments to test the comparative value of lime and marl, were made on adjoining pieces of land of the same original quality, and previously manured from the same heap. The soil on which the first experiment was made, was a fine loam, rather stiff. I applied seventy bushels of unslacked lime per acre, and one hundred and forty of the marl, or two measures for one.—The land was put in corn, succeeded by wheat, and is now in clover. The two former crops were equally and manifestly benefited by the calcareous matter, but the clover exhibits a much more flourishing appearance on the marled part, although it is very fine where the lime was applied.

The land on which I tried the second experiment is now in corn. The soil is light. The quantities of lime and marl, and the previous improvement the same as before. The corn on the marled part is equally as good as where the lime was used, and strikingly better than on the adjoining land which had received the same dressing of putrescent manure.

The marl used was brought by water 12 miles; and I applied only 140 bushels per acre, because the cost of this quantity, and of 70 bushels of unslacked lime, was found to be nearly the same, and from the tried efficacy of the lime, I well know, that, if the effect proved to be equally great, I could extend the use of it to great advantage. Contrary to my expectation, the results of the experiments stated, fully establish the fact that the 140 bushels of marl are at least as efficacious as half the quantity of lime. You ask how much the crop was increased by the marl? I regret that I did not ascertain by measurement, and cannot therefore say precisely; but it may be confidently affirmed, that the increase of the first crop of corn and wheat will repay the whole cost of the marling, and the land will be left permanently improved.

I observe that one of your correspondents in the middle country has made some inquiries of you in regard to the value of burnt clay as a manure. I have tried it, but cannot affirm that the clay used was of the right sort. The effect on light land is not perceptible; on a cold tenacious soil the effect is greater, but not sufficiently great to justify the continued use of it. I find my time much more profitably employed in collecting leaves from the woods, and converting them into manure.

WM. B. HARRISON.

For the Farmers' Register.

ON THE LAW OF ENCLOSURES.

Respectfully addressed to the Members of the General Assembly of Virginia.

Justice and policy have concurred in fixing as a general principle in the laws of civilized nations, that *every individual should be compelled to refrain from trespassing injuriously on the property, or otherwise doing wrong, either directly, or through others under his control, to any other person under the protection of the laws.* In Virginia, however, there is one most important exception to the general adoption of this principle. The whole land of our country is, in effect, deprived of this protection against trespassers and wrong-doers. Our law does not forbid A to suffer his cattle to eat and destroy the growing or ripe crops of B, but compels B to secure his fields effectually against the entrance of the cattle, or otherwise maintains A as innocent. In this case the rule just named is reversed, and so far as our fields and crops are in question, the principle adopted is this—*every individual shall guard and protect his property from depredators, and every one is permitted to consume or destroy all that may not be well guarded.*

The injustice of this reversed rule would be readily admitted by any one who considered the question abstracted from the circumstances from which our policy sprang, or who was not in some degree blinded by being accustomed and reconciled to the practical operation of this policy. But I am no advocate for aiming at theoretical perfection in government, or consulting arithmetic and geometry, rather than the actual condition of men, to make rules for their direction. I freely admit that at a former time, circumstances in Virginia required the general adoption of this policy—and that it is still expedient over a large portion of her territory. But in another large portion of the state, from change of circumstances, this policy has become as injurious in its practical operation, as it is unjust in theory.

When our country was newly settled, the extent of cultivated land was very small, compared to the forests and waste land, much of which, even in that state, was valuable for pasturage; and it was by far cheaper to fence a few and small spots of arable, than their extensive woodland pastures, or *range* for stock, and the range was much too valuable to be abandoned. It was beneficial to every landholder that such should be the general plan of enclosures, although the open land thereby became one large common pasture, for the use of him who owned but little, or none of it, as much as for those who owned the largest shares. According to these views our legal policy with respect to enclosures was fixed—and from it all derived at first some benefit, though certainly the benefits were very unequally divided. The law, stated generally, requires that each owner of a field shall surround it with a good fence, of a certain height, or shall have no remedy against the intrusion of his neighbors' live stock.

But now the state of things in much the greater part of eastern Virginia is altogether changed. All the fertile land has long been cleared and made arable, and much more of such as is extremely poor, is also under tillage. In districts where the soil is, or has been, of good quality, very little timber for fencing remains, and, consequently, the expense of fencing is increased greatly more than in proportion to the increased extent of enclosures. The remaining woodland is poor, and so worthless for pasturage or *range* for stock of any kind, that many of its owners make no use of their unenclosed woodland for that purpose. But this abandoning the use of their woodland (which in fact is not worth using by any one,) does not relieve the owner of the expense of fencing his arable land—and this is required merely that other persons may not be deprived of the use of this woodland for range, which he does not consider worth using as such.

The great extent of fencing required bears especially hard on the tide-water region. There, on and near good lands, the original growth of durable pine and good oak has all been destroyed—and a choice has been already, or soon will be presented to every farmer, either to purchase suitable fencing timber at a distance, or to use the *old field* pines which form the second growth of his worn fields, and which are not more remarkable for their rapid growth, than for their rapidity in rotting, when used for fencing timber. There are no durable materials for dead fences, and the frequent divisions of lands, as well as the laws permitting stock of every kind to range at large, forbid or discourage the attempt to make live hedges. There are many farms which have five miles of perishable fences to keep in repair, that do not yield $500 of clear profit; and many other tracts are thrown out of cultivation, and yield nothing to their owners, (who in most cases are the especial *favorites* of our laws—widows or orphans)—because the expense of lawful fencing would exceed the whole rent.

Under this system and these circumstances, farmers who make suitable enclosed pastures for their own live stock, (as every one ought to do for his own interest,) are burdened with the expense of two kinds of fencing, for two different objects. His own interest requires that he should make an enclosure to keep his own cattle *in*, and the law compels him to fence his cultivated lands, to keep the cattle of other people *out*.

It is impossible to estimate with any approach to accuracy the enormous loss caused to the farmers of eastern Virginia, by this unjust policy. But if each person will calculate the amount of his own individual loss, it will be sufficiently evident that the whole annual amount is enormous.

It is admitted that the evil of this policy is not so felt by all who bear even its heaviest burdens. There are many, who because they have never known any different state of things, can scarcely conceive the advantage of making every man restrain his own cattle within his own bounds. Therefore, even if the legislature was impressed with the opinions I have advocated, it would be improper to make any general or sudden change in our system. Most of the benefits of a change might be secured, and the objections avoided, by partial changes of this law of enclosures, for such particular districts as would accept the offer by the voices of three-fourths of their proprietors, and they owning not less than three-fourths of the land within the boundaries of each district. If such a privilege was accepted by the owners of a district of five miles square, for example, they would still be bound to maintain at their joint expense a general enclosure in obedience to the general law, and to exclude the cattle of all persons residing without their limits. But the expense of such general enclosing fence would be very inconsiderable, and would be diminished to each individual in proportion to its greater extent. Such a plan would secure to every considerable tract of country either kind of policy that its inhabitants were decidedly in favor of—and would be free from every reasonable objection. If the people of any one neighborhood were permitted to adopt the change proposed, under proper restrictions, all the risk and loss of the trial would be confined to them, and if it succeeded, the whole community would participate in the benefit.

If our legal policy in this respect was altogether changed, there are many farmers who would still refuse to profit by the boon: and from their fondness for close grazing their fields by as many cattle as can be kept alive through the year, would keep up their present amount of fencing, though their fields would be no longer liable to the depredations of any cattle but their own. But most persons would soon learn the benefit of pursuing a different course. Each farmer having to maintain his own cattle, would keep a smaller number, and confine them generally to a permanent pasture

well enclosed: and by being necessarily reduced to one-fourth of their present numbers, and treated as well as the change of system would permit, the live stock would yield more products of every kind (except *hides* perhaps,) than at present. The lands kept for tillage, thrice as extensive as the enclosed pastures, if too poor to be grazed, might be safely left without a fence, until their improvement in after time may make enclosures necessary for the owner's interest. There can be no doubt but if permitted to get rid of the burden of making and repairing three-fourths of our costly and perishable fences, that the change would be almost necessarily followed by greatly improved products from both live stock and tillage, as well as increased fertility to the whole country exempted from the usual impoverishing and unprofitable grazing of poor fields by poor cattle.

SUUM CUIQUE.

EASY MODE OF MEASURING THE CONTENTS OF CORN CRIBS.

To the Editor of the Farmer's Register.

Perhaps the following short and easy rule for ascertaining the number of barrels of shelled corn in any crib or house filled with corn in the ears, may be acceptable to some of your readers.

Rule.

Find the solid content of the house in feet; that is, multiply the length, breadth and height of the house continually together; then multiply their product by 8, and cut off the two last figures; this will give you the barrels and decimals of a barrel of shelled corn contained in the house.

Example.

In a crib measuring on the inside 20 feet in length, 12 feet in breadth, and 10 feet high, there will be very nearly 192 barrels of shelled corn.

20
12

240
10

2400
8

192.00

I found this rule in pretty general use in this neighborhood when I came into it some years ago, but none of those who used it could give a reason for its correctness. It will be easily seen that it is only a substitution of the decimal .08 for the vulgar fraction $\frac{1728}{21500}$ to which it is a pretty near approximation.

The solid feet in a crib are multiplied by 1728, the solid inches in a foot, and the product is divided by 2150, the solid inches (rejecting $\frac{2}{3}$ of an inch) in a Winchester bushel; this shows the content in bushels, which, divided by 5, the number of bushels in a barrel, gives the barrels of corn in ears. And as 2 barrels of corn in ears are supposed to be equal to 1 barrel of shelled corn, the quantity of the latter may be expressed by multiplying the solid feet of the crib by the compound fraction $\frac{1}{2}$ of $\frac{1}{5}$ of $\frac{1728}{2150}$, which is equal to $\frac{8}{100}$ very nearly. Those who wish to be more exact, may add two bushels and two gallons for each hundred barrels.

H.

SASSAFRAS BUSHES—MURRAIN.

To the Editor of the Farmers' Register.

Buckingham, Nov. 5th, 1833.

In the third number of the Farmers' Register, a writer over the signature of Anti-Sassafras, inquires whether any reader of that periodical can direct how to eradicate the growth of sassafras in cultivated ground.

Having succeeded in entirely destroying the shrub, I will now proceed to give the information desired. It is simply to cut down or grub up the sassafras in the winter, and turn a flock of sheep on the land in the spring, and keep them on the land during the spring and summer of that and the succeeding year.

The sheep are very fond of the sassafras, and will browse the young scions as soon as they appear above the ground; and the twigs not being suffered to grow or put forth leaves, the roots naturally perish.

A writer in the same number thinks that there is no cure for the murrain in cattle. I formerly resided in the lower part of this state, where the murrain was very fatal to cattle. I tried many remedies to which I was advised, without success. Discovering that the bladders of the cattle that died were invariably filled with bloody urine, I determined to try what effect bleeding would have, and found that it was by far the best remedy I had used.

My plan was, to bleed them in the neck as you would a horse, and take as much blood as they could bear without fainting. When bleeding was resorted to as soon as the cattle appeared sick, the remedy was generally successful.

As a preventive, I had all my cattle bled as soon as the disease made its appearance, and generally succeeded, I thought, in lessening the number that sickened, and in mitigating the violence of the disease in those that were attacked.

Respectfully yours,

SKRINICSKY.

ARTIFICIAL GRASSES IN LOWER VIRGINIA.

To the Editor of the Farmers' Register.

Fort Monroe, Oct. 30th, 1833.

My experience as a farmer will not enable me to add much to the stock of agricultural knowledge. The consciousness of this fact, however, will not deter me from occasionally troubling you with my reflections: take them for what they are worth; as I grow older in the profession, they may possibly become more interesting.

I shall not be accused of pedantry, for having affixed my name to this communication: practical subjects, particularly those connected with the science of cultivating the earth, should never be treated anonymously. A fact or a suggestion thus promulgated, cannot carry with it the same weight as one made under the authority and responsibility of a name; and a hint which, over the signature of Arator, might have been unnoticed or ridiculed as visionary, if subscribed by that of John Taylor, would have been eagerly seized and acted upon.*

* We wish that all our correspondents were impressed with these truths. All communications signed by their authors, command far more attention, than they would if anonymous.

There is no class of men more wedded to the notions of antiquity, or more averse to innovating upon the venerable customs of their forefathers, than farmers: to a certain extent, this is undoubtedly a laudable propensity, as it restrains scheming within proper bounds; but it may be carried so far as to set a limit to improvement. Agriculture is a progressive science, and there is no reason why, in the scale of improvement, it should not make as regular and as rapid advances, as other more abstruse, but less useful ones.

No one circumstance more fully illustrates the error of adhering to preconceived notions, and taking for granted that "what every body says is true," than the very general opinion, that the climate and soil in this part of the state are not congenial to the growth of artificial grasses. Nothing can be farther from the truth; and I do not hazard too much when I say, that timothy, herds grass, orchard grass, tall meadow oat, feather grass, clover, and lucerne, all of which I have fairly tried, thrive as well and grow as luxuriantly as in most parts of our extensive country. For five years I have turned my attention very much to this branch of agriculture; two or three enterprising gentlemen in this, and in Norfolk county, have done the same. The charm is now broken; all acknowledge that our hay is as good as ever was imported from the eastward; and in a few years, I hope to see our old fields transformed into profitable meadows. I have now before me a few spears of timothy of my last crop, to verify my assertion. They measure five feet and upwards in length. I do not offer them of course as a sample of the crop, but merely as an evidence of what our soil and climate are capable of producing: for if twenty spears can be raised, twenty acres may, under similar circumstances of soil, location, &c.

I committed a serious error in my noviciate, in mixing my seed without a proper reference to their period of ripening: for instance, I sowed red clover, timothy, and herds-grass together: the clover was ready for the scythe in May, the other two were not ripe for three or four weeks afterwards: I consequently lost the best part of my clover crop. But that was not all; had I cut the clover as early as I might,) and the proper time is when it is fully in bloom, without waiting for half the heads to turn brown,) it would have had a chance of springing before the hot and dry weather set in here; whereas, waiting for the ripening of the timothy, the roots became suddenly exposed to the full influence of the sun, and were totally killed. The like objection applies to mixing meadow oat and timothy; the first ripening three or four weeks before the latter. Here, however, the same inconvenience does not result to the same extent. The meadow oat is much more hardy than the clover, and even after it has shed its seed, and become perfectly dry and yellow, it still makes good hay, and is eagerly eaten by stock. The best mixture therefore, if mixtures are to be used, are timothy and herds-grass, and meadow oat and clover, as they ripen about the same time. I think the latter very important, as they make much better hay than either separately. Clover is at all times difficult to cure, and in the process loses a large proportion of its leaves: this is in a great measure obviated by curing it with the meadow oat; besides, the stubble affords considerable protection to the exposed roots of the clover.

As to the best time for sowing grass seed, I am still somewhat in doubt; that is, I have very little choice between early fall and early spring sowing; say the latter part of September and February. If deferred until November, the young plants cannot withstand the winter's cold: if delayed until April, they are burned up by the summer's sun. When sown alone then, I should prefer September, as you thereby save nearly a year; but if I wish to sow on a grain crop, I would do it in February or early in March.

I last spring sowed orchard grass and clover on wheat; half the field was first harrowed, and the seed sown and left on the surface; the remainder was harrowed after the seed were sown: I can now perceive no difference whatever in the appearance of the grass. I believe the wheat was benefited by the operation.

I apprehend the great causes of failure with those who have had courage to attempt the cultivation of grasses in this section of country, have been, first, an unwillingness to risk a doubtful experiment on good land; and secondly, the unpromising appearance of the crop the first year. I confess I was myself very much disheartened, and actually broke up several pieces of grass, which would have turned out well, had I exercised a little patience. This was particularly illustrated on sowing a low piece of ground two years since. It was roughly ploughed, and the seed covered with a heavy drag in September. I watched it very closely, and as late as the following March, could not discover a single blade of grass. I concluded the seed were bad: the fact is, they were buried so far beneath the surface, that they did not vegetate until spring; and I this year cut a fine crop of timothy and herds-grass from it. This fact determined me in all future sowings, either to leave the seed on the surface, or to cover them lightly with a bush harrow.

My experience with lucerne has been very satisfactory. I have cultivated it six years, and consider it one of the most valuable grasses known: its yield is immense, and is preferred by stock to almost any other, either green or in the form of hay. I cut it five times a year, and get as much from each cutting as if it were repeated but twice or three times: for soiling, therefore, it is invaluable. I usually sow it in drills three feet apart: this enables me to cultivate a cleansing crop between them, so that in working one I work the other, which is absolutely necessary, as without it, the lucerne is soon overrun and destroyed by the native grasses. This appears almost a paradox in vegetable physiology, considering the great depth (50 or 100 feet) to which the tap root of the lucerne has been traced in pursuit of water. I this year raised a crop of mangel wurtzel between my rows, with as little inconvenience as I could have cultivated either separately.

The lucerne is a very hardy plant, and resists heat and cold better than any other grass with which I am acquainted. It grows luxuriantly at this place in the sand fertilized with stable manure, without the addition of a particle of clay or vegetable mould. It will also grow on a stiff soil, but a light loam is best adapted to it. In February, 1832, the weather mild and open, I drilled a small lot of rather stiff shelly land with lucerne: it came up beautifully in eight or ten days. Every body here recollects the extreme cold weather we

had the March following: I gave up my lucerne as lost; but I don't believe I lost a single plant. It continued green the whole time, and I cut three crops from it the first year.

I have made but one experiment in sowing lucerne broad cast: it did not succeed, and may have proceeded from the imperfect preparation of the land; but I rather think the drill system will be found to be the best in the end.

ROBERT ARCHER.

CHEAT OR CHESS.

To the Editor of the Farmers' Register.

Farmville, Prince Edward.

Volumes have been written on the question, is cheat the product of wheat? This has for years been the great enigma which has kept alive the curiosity and investigation of the agriculturist. The following thoughts were suggested to my mind, after reading two articles from your last Register, by Gideon Ramsdell and David Thomas; and you will perceive that I have embraced Mr. Thomas' views; viz.: that cheat is not the product of wheat.

1. I believe that it is contrary to the laws of the vegetable kingdom, for one plant to produce another of a different nature. A single seed of any kind contains within itself, the whole succeeding generations (if I may use the expression) of seeds. For example; in the acorn is a forest. In the single mustard seed, are myriads of infant embryonic plants. In the tobacco seed, lies concealed enough tobacco to freight thousands of ships. Now if we admit a departure in one instance from this rule in the vegetable kingdom, we at once derange the whole order of nature. 2. But admitting that cheat is the product of wheat. Then it is a degeneration. And all degenerations, from the same causes continue to degenerate. Then what is wheat this year will be cheat the next, and something else the next, and so on. But this is not so; for cheat will when sowed come up, and propagate with perfection: thus proving itself to possess the full powers of germination, which proved that it is not "the degenerate son of a worthy father," but a father standing on his own bottom. There are several other views I would introduce here; but they might be thought unnecessary. 3. The same causes, under similar circumstances, will produce the same effects: but this maxim does not hold good here. Wheat in a defective state, which has been cut or eaten down, which has been left uncovered, &c. does not uniformly produce cheat. 4. If wheat produces cheat, we may reasonably conclude that oats would produce a cheat. And if so, there would be the same difference in appearance, between the cheat produced by the oats, and that produced by the wheat, that there is between the two kinds of grain. But we find that the *same kind* of cheat is found in both. 5. From my earliest recollection I have noticed the mixture of "volunteer" wheat, oats, rye and cheat, about old treading yards, or stacks or granaries. I have seen good wheat, and rye, and *good cheat*, growing up to full maturity side by side. Now, they all had stood the winter together. Had slept "pigging together in the same truckle bed," as Burke says, (I believe these are his words)—had slept there together the whole winter, and still they had respectively preserved the utmost chastity. Can we be made to believe, that the cheat seen in these circumstances sprang up from the seeds of wheat? No, sir, I cannot, for reasons before given.

These views may not be new to you, or they may be new and incorrect. They have just been suggested to my mind, and it occurred to me, I would send them to you, to use as you might will. I do sincerely wish you the fullest success, in your endeavor to give new life to agriculture in Virginia. And I think a few years will prove the great value of your excellent publication. The public are well assured, that the Farmers' Register is no "cheat." But that cast upon the waters "after many days" it will produce fruits of a *good kind*. Virginia, can never regain her former stand in the union, without improvement in her agriculture; and agricultural publications, as time and history demonstrate, conduce more to this end, than any other means. "Knowledge is wealth, and information power." I have seen one single article in your Register, containing truths, to obtain a knowledge of which, a man might *well afford* to pay the year's subscription. My feeble aid is at your service. And I will do all I can, to cause an increase of subscription in this part of Virginia.

With high respect, yours, T. McR.

EXTRACTS FROM PRIVATE CORRESPONDENCE.

October 17, 1833.

* * * One of the good effects I have experienced from taking agricultural journals, is a zeal, which though often evanescent, sometimes results in permanent improvement. Arator made me a non-grazer, and a good ploughman; your book and Register will make me a marler (if I have it,) and has already determined me to put one of my farms on the four-shift system. In agriculture as in morals, we often know more than we can reduce to practice; at least, this is my case. Yet with what I consider only tolerable management, I have quadrupled my crops of wheat on one of my farms, in the course of fifteen years, and value it now at $6,000 more, than it was worth when I first owned it.

I should like to see in your Register, a more full and minute description of the augers, &c. used in searching for marl: and think they would be readily sold by any dealer in iron or smith, who could give assurance that they were made by an approved model. I have been prevented from purchasing these things, because I know not where to procure them, and have not myself sufficient knowledge of their construction, to direct their manufacture.

CLOVER ON POOR LAND.

Farmville, Nov. 7, 1833.

I have long been impressed with the futility of attempting to grow red clover extensively, on our poor, thirsty sandy soils; unaided by calcareous manures, I believe it had best not be attempted. Of course, I was much pleased at the idea suggested, in an article on gama grass, in your fourth number, that it might be better, to substitute some of our coarse indigenous grasses, whose strong roots strike deeper in the ground. Clover may, however, be made to *live* in thin land, by sowing the seed in the month of August, on stubble grou[nd]

and harrowing them in. The plants have then the benefit of the autumn rains and strike their roots sufficiently deep before winter to bear the cold, and will produce a crop of seed the following year. When sown with small grain, they are overshadowed and kept back by it, until harvest, when they are suddenly exposed to a burning sun, at the most trying time of the year. All this is obviated by sowing on stubble, and I have known a gentleman in Buckingham succeed by adopting this plan. * * * * *

WILD PEA VINES.

I have often been told by the *old people*, of the astonishing luxuriance of the tall wild pea vine, in *old times*, on lands now the poorest—of the great quantities of food which it afforded for stock, and the extreme mellowness which it caused in the soil. It has perennial roots resembling the sweet potato, which were eaten with avidity by hogs; and its vines, leaves and fruit were greedily devoured by horses, cows and sheep. So that its very value seems to have caused its almost utter extermination. With so much worth and so many enemies, is it not entitled to a single friend? In short, would you advise a crop of it? I have lately found a few seed, and think it might be advantageously used, either as an improver of land, or as fodder. It certainly afforded much manure to our lands in former times. At least they have become very poor since its departure. Whenever it becomes necessary to cultivate its ground in another crop, its roots might be fed to hogs, or ploughed up and transferred to other land.

* * * * *

I was much pleased with some very timely and very sensible inquiries by your Louisa correspondent, who it seems, like your humble servant, and perhaps many others of your subscribers, lives on poor land. What would you think of lengthening the rotation on such lands? Or at least, of cultivating them much seldomer in a hoe crop? The greater returns of small grain and grass crops, might, perhaps, make ample amends for any deficit in the crop of corn. I consider hill-side ditches and horizontal ploughing as the best means of preserving poor land, and consequently of restoring it, at least to its original fertility, and as the greatest discovery in agriculture for our middle country, which has been made since its settlement.

GAMA GRASS.

Prince Edward.

I have long known the article described under the name of "Gama Grass" in the 4th number of the Register. Fifteen years ago, finding the cattle fond of eating it, I scattered the seed in the fence corners, and in that way propagated it to some extent, though I have never regularly cultivated it. There is now, in one of my meadows, a patch eighteen or twenty feet square, almost exclusively of this grass, It contends well with all other grasses, but I find it in time overpowered in the fence corners by bushes and briers. It would doubtless need cultivation, if cut six or eight times in the year. I suspect the variety in this vicinity is larger than those described in your fourth number. It has nine or ten seed on every spike—I have found but one with fewer than nine. A friend brought half a dozen seed to me from Newbern the other day—(where they sell at one dollar per quart)—evidently smaller than those growing in this neighborhood. Ours is, however, evidently a *tripsacum*, grows most luxuriantly and makes fine hay. I measured a stalk the other day nine feet in length. Its spikes are generally cylindrical. They sometimes grow out double, and then are flattened on one side. * * * *

HESSIAN FLY AND SMUT IN WHEAT.

About the year 1800, for the first time my father discovered Hessian fly in his wheat; just then, for the first time, the clover on the farm produced slavering with the horses. Can there be a connexion between these evils? I know the latter is ascribed to a little parasitical vine growing on the clover. On several occasions I have known seed-wheat scalded to remove smut, and the crop produced was exempt from Hessian fly. I know it is sometimes exempt when there has been no scalding; yet with other facts it affords ground for suspicion, that some minute insect artificer (I suspect a little black tickling insect, which appears in numberless multitudes during harvest, and which appeared for the first time about 1800,) produces the evil by depositing its eggs in the grain. The insect hatched from the egg, I know, is very different from this one, but these creatures pass through many transmigrations. A gentleman took some seed wheat from Virginia to Alabama. The succeeding crop was well supplied with Hessian fly, and stocked a neighborhood previously exempt. To scald seed-wheat, the water should be heated on the margin of a running stream, into which the basket of wheat may be plunged after dipping it for a moment, into boiling water.

Last year, having the misfortune to have some of my wheat smutted, I kept some smutted grains from which hatched a number of worms, which grew more than half an inch long, and which I suspect to be the cause of the evil. I had long suspected this disease and several others to be produced by insects—for I could not well conceive how the atmosphere could contain a poison destroying one crop and not touching another immediately adjoining.

I have known smut in wheat entirely cured by scalding the seed in lie, and by rolling in quick lime after wetting. In both of these processes, I presume there is heat enough to destroy the egg of the insect. I have also known seed-wheat soaked several days in strong but cold lie, without preventing smut. I suspect that it has been *heat* which gave efficacy to most of the *pickles* in curing smut.

MARLING.

King William, Nov. 7, 1833.

It gives me the highest pleasure to observe the rapid progress marling is making among us. Population being the natural result of agriculture, I doubt not, but marl is destined, not only to enable lower Virginia to retain in her bosom her native born sons, but to give her many by adoption. It is important to convince that class of farmers who labor in their fields with very few servants, or none, that it is to their interest to use it. Two of that class in this neighborhood have commenced

its use, and are so pleased with the results that they intend continuing it. Few acts of my life afford me more pleasure than the belief of my instrumentality in setting them about it. Could it become with them common, incalculable advantages would result. One of themselves will have more influence than whole neighborhoods of a different class. We should labor to induce them to adopt it.

* * * * *

A second year's trial of the Guinea grass has resulted in a firm conviction of its happy adaptation to our wants. Should you want any seed I can furnish you, but still I do not rely upon their vegetating, having with me come up badly: how to account for it I know not, unless the plant from frequent propagation by slips has lost the power of fully maturing its seed. Certain it is the climate is not the cause, as it will bear seed after being cut, I believe, twice. This difficulty is much lessened from the circumstance of one small root being able under proper management to furnish a large supply in two seasons.

A PLEA FOR SNAKES.

To the Editor of the Farmers' Register.

It has long been my opinion that the increase of insects and other vermin which injure the crops of the farmer, or cause detriment to his labors and comforts, has been greatly aided by the endless and destructive war which is carried on against animals which make prey of such devouring plagues. It seems that the disposition to destroy life in every animal whose existence is not manifestly a source of profit is natural to man; and shows itself with more or less force in most persons, notwithstanding the checks imposed by education, and *acquired* sentiments of mercy. In early childhood we mutilate and kill flies for sport, then proceed to the destruction of such nobler game as toads and frogs, and continue through life to kill birds, beasts, and reptiles, if not for the pleasure, at least whenever there is the slightest suspicion or appearance of their being hurtful to our interests: and we are so ready to act upon such a suspicion or belief, that some of the most serviceable of untamed animals are never spared because they consume a little of our grain, in payment for the preservation of ten times as much. I have been pleased to see, Mr. Editor, that you have selected and published (though I fear to but little purpose) several good articles which show that benefit, as well as injury to the farmer, are produced by crows, hawks, and owls—and that the great amount of good which many kinds of birds effect by destroying insects, is a clear gain, being accompanied by no other habits injurious to man. These, our little benefactors, are seldom spared from any consideration of their usefulness in destroying caterpillars and bugs—and no mercy is shown to a crow or owl, though the former eats more cut-worms and bugs, than grains of corn, and the latter (especially of the smaller kinds) will kill one hundred rats and mice in the fields, for every chicken they may seize as their hire. But I leave all these to the care of former and better advocates, and will confine my observations to another race of animals which is the most persecuted of all, and whose numerous and valuable services to farmers are accompanied by scarcely any acts of an opposite character—I mean *snakes*.

Very few of the snakes in lower Virginia are poisonous, and those few are rare, or confined to such localities, and have such habits, as render them almost harmless. But all that are known to be poisonous, I willingly give up to the vengeance of the snake killers. The dreadful rattle-snake is now scarcely known below the mountains, and the two kinds of moccasins, both confined to water, or wet ground, are almost the only snakes which are dangerous, and may be often found. The adder truly has a most ugly and venomous look, when he spreads broad his head and neck in anger, or from fear; but if he possesses poison, I never have heard of its being used in this country. I have read of a man in England who made his living by killing adders and selling their fat, which was used for its supposed medicinal virtues. His dog that had been taught to find the sluggish adders, was sometimes bitten by them, but the poisonous effect was always quickly removed by rubbing the wound with adder's fat. This is the only evidence that has reached me of the adder being poisonous, and it serves as well, to prove that their poison is followed by very little pain or danger.

But the most numerous and useful snakes are certainly not poisonous, and the fear and horror with which they are regarded, are founded altogether upon vulgar error and prejudice—and perhaps have grown out of what was originally a mistaken religious duty. But whether it is to "fulfil the command of the Scriptures," or from hatred and fear, almost every person who does not run away from a snake, kills it if it can be done. To spare a black-snake, or a ringed or king snake, that can be killed, is seldom done—and some carry this general antipathy so far, as to kill the little green snake which winds among the branches of trees, and is one of the most beautiful as well as the most harmless of animals.

Rats and mice, both in the field and in the house, are great destroyers of the farmer's grain, and they have no enemy so fatal to them as the black snake. One of these sometimes takes up its residence in a barn, until discovered and killed by some one of the greatest of all the snake's enemies—negroes, and fools, whether white or black. I have several times had the benefit of such an inmate in my grain houses—but was never able long to prevent its being killed. If they were not disturbed, there would be few barns or corn cribs without a snake, and no rat or mouse could long keep possession. It is not that they can eat many, and probably do not kill more than they require for food. But they are able to pass into every hole and hiding place of the vermin they pursue, and thus drive them away. I knew a granary which for several years together was never clear of grain, and generally had a large quantity of corn, in the shuck. The house in other respects was well fitted to conceal rats and mice from all the attacks of cats and of man—and as might be expected, they increased greatly, and destroyed and injured much of the corn. The rats were so often outside of the house, as to furnish good sport to gunners, and many were shot, with the hope of thinning their numbers, though to no purpose apparently. Afterwards, when the evil was supposed to be still increasing, and there appeared to be no remedy but emptying the house, (which could not then be done,) the rats and mice disappeared without any

known cause. If any remained, the number must have been small. I suppose that black snakes had got into the house, and had been concealed and protected by the contents, until they had time to destroy, or drive off the rats.

But though snakes are seldom suffered to clear our houses in this manner, they must render much service by destroying the different kinds of field rats and mice. Wherever arable land is not grazed, these destructive little animals increase rapidly, not only on account of the shelter of the high weeds, and greater supply of food, but probably also because hogs are excluded, and kept from rooting up their nests and destroying their young. This evil, which is sensibly felt by all *non-grazers*, would be completely kept under, by simply sparing the black snakes, and such others as are not venomous.

Now, for the loss and injury caused by these persecuted animals. The most that can be said, is that sometimes, and rarely, a fine large snake finds his way into the poultry house, and gorges himself by swallowing eggs and young fowls, until he is scarcely able to move, and falls an easy prey to the avenger of the crime. The snake does not, (like other thieves,) make many and hurried visits to the scene of his depredations, and commit much injury before he is caught. When he finds so good an opportunity, he swallows as many chickens as he would of rats, if permitted, and has as little power as inclination to leave what he considers such good quarters. If all such are killed, and none others, the number would be too small to be of any importance. But if the case was mine, though I would not leave a snake free access to my chicken house, I would not kill him for the first offence; but when taken gorged, move him unhurt to some distant house, infested with rats. He would probably remain still for several days, until his heavy meal was digested, and then would be satisfied to take the kind of food there offered him in abundance. N. F.

LARGE VEGETABLES.

From the National Intelligencer.

At the horticultural exhibition of the Massachusetts Horticultural Society, on Saturday the 2d inst., pears were exhibited weighing twenty-eight ounces; a mangel wurtzel, weighing thirty-six pounds; and a sugar beet, weighing twenty-three pounds. These exhibitions are held in the apartments regularly appropriated to this purpose, in Boston, on every Saturday. This weekly exhibition closes at noon of the day on which it is held. It is in general well attended, and is a most effective aid in improving the quality of the fruits and esculents in all the country round.

ON SOILS IN WESTERN NEW YORK.

From Goodsell's Genesee Farmer.

The editor of the Maine Farmer, in noticing an article from Gen. Harmon, as published in our paper, on the produce of wheat in the southwestern part of this county, asks for information respecting the soil, &c. to which we reply—

Western New York, or that part between Utica and Buffalo, is of secondary formation. For many miles south of Lake Ontario, the superincumbent rock is the saliferous, or red sand rock. The greater portion of the soil, immediately over this rock, is a light sand, easily worked, producing, when first cultivated, light crops. Above this is a formation of calciferous shale, of about one hundred feet in thickness. As might be expected, the outcroppings of this formation extend over a large extent of country, and by disintegration, forming a soil, which contains both clay and sand. This soil is counted of first quality for wheat, grass, and most crops grown in this section of country. Above this are the geodiferous, and cornitiferous lime rocks. These taken together may be counted at about fifty feet thick. In an agricultural view there is little difference in these rocks, as they both possess the same general characteristics. Near the bottom of the formation, the rock contains more silicious particles, and near the top there is a greater portion of alumine. Directly upon this formation rests the bituminous shale, a formation of about a hundred feet in thickness. This formation has by some been called the pyriferous, in consequence of its containing in most places innumerable particles of iron pyrites, or sulphuret of iron.

The town of Wheatland (which is that part of the county of Monroe referred to in the inquiry,) has mostly for superincumbent strata, the upper part of the cornitiferous lime rock. This rock, as has been observed, contains considerable alumine, and the soil formed entirely from the disintegrated rock, might with propriety be called a rich marl, as much of it will effervesce with acids.

There is one peculiarity in the town of Wheatland, which perhaps might be proper to notice in this place; that is the situation in which sulphate of lime, or plaster of Paris, is found. This is not in a continued strata, but in small parcels or nodules, near the surface of the rock. The presence of these are indicated by the inequality of the surface, the projections indicating the extent of the sulphate beneath. This sulphate is evidently of later formation than the rock in which it is found. The rock in which it is imbedded is in thin layers, many of which are not more than an inch in thickness. Immediately surrounding the sulphate of lime these layers are broken, and disturbed from their original position, by the force of the cristallization, or the effervescence which preceded it.

To account for these masses of sulphate of lime, we must have reference to the time when this lime formation was covered with the bituminous, or pyriferous formation, which we have before mentioned. It is well known that the decomposition of iron pyrites produces sulphuric acid, and that sulphuric acid, when combined with lime, produces sulphate of lime, or plaster of Paris. That there is a constant decomposition of the pyrites going on in the bituminous formation of this section of country, is evident from the circumstance, that there are in this vicinity several springs, the water of which contains so great a proportion of sulphuric acid, as to render it unfit for common uses, to which water is applied for culinary purposes.

The probability is, that the sulphuric acid thus formed, percolated through the bituminous shale

until it came in contact with the carbonate of lime, which was decomposed, and sulphate of lime formed; and as the sulphate of lime required more space when formed, than the carbonate did before its decomposition, the expansion produced the inequalities, which indicate its location.

But it is not to be understood that all the soil in this or the neighboring towns are formed directly from the disintegration of the lime rock. The surface of the country here is uneven or undulating, the higher parts of these undulations being composed of materials bearing evidence of having been deposited there by water. The interior of these undulations are mostly coarse washed gravel, diminishing in size towards the surface, which is mostly fine silicious particles intimately blended with lime, and clay, among which in many places may be discovered small grains of sulphate of lime.

One peculiarity of the soil, in the district above alluded to is, that the more it is cultivated the greater the produce. It is safe to say that the crops have increased twenty five per cent. within the last five years.

SALT YOUR CORN.

From the Alabama Intelligencer.

Mr. Brown, of this vicinity, communicated some information to us, in a conversation recently held with him in regard to the use of salt in corn, which is put away in the husks, which may be interesting to the public. He stated that he received last year a quantity of corn, which he had purchased in so wet a state that he was apprehensive that it would spoil. He remembered that it was a common practice in Pennsylvania, when hay was put away somewhat damp or not fully cured, to sprinkle salt on it, and that such hay generally kept well, and that horses and cattle were very fond of it; he therefore concluded to try the experiment on his corn. He accordingly, as his corn was thrown in a pile on a large floor, sprinkled it with salt, using from half a bushel to a bushel of salt to five or six hundred bushels of corn. The corn kept well, never became musty, and never had any weevil in it. Mr. B. still had of this corn when he communicated this information to us; and he stated that the bread which it then made was so sweet and good, that it was esteemed preferable to that made of new corn. He also stated that he was not under the necessity of purchasing any fodder for his working oxen last winter, they fed upon the husks of this corn so freely; and he added, that they kept in excellent order. Mr. B. was so well pleased with this experiment, that he is putting up all his corn this year in the some manner, using about half a bushel of salt to five hundred bushels of corn, which he thinks is enough.

PETERSBURG RAILROAD

Extracted from the [N. Y.] Rail-Road Journal.

The last object of my tour was the Petersburg and Roanoke railroad, in Virginia. This road is now completed from Petersburg to the Roanoke, a distance of about sixty miles. The grade of the road, with the exception of two or three planes, with an ascent of twenty-seven or thirty feet per mile, is very favorable to the use of the locomotive engine; and their success with this kind of power has not been surpassed in the country. They have now three engines upon the road, a part of which have been at work upwards of nine months, and made their trips with as much regularity as could have been expected from horse power. One of those, the "Liverpool," is probably, for her weight, the most effective engine of the country. This, and one of the other engines on this road, were constructed by M. Burry, of Liverpool, who has also furnished two engines for one of the Schuylkill railroads, which I am informed work equally well. The proprietors of this road consider it as part of the great line of communication from north to south, and look to its ultimate connexion with the Charleston railroad, by similar works, through North Carolina.

The opening of the Charleston railroad to Augusta, which is advertised for the first of October next, in connexion with the two lines of steamboats now being established between New York and Charleston, and between Norfolk and that city, will, with the exception of the short distance from Augusta to Montgomery, complete the facilities of the great line of communication from Boston to New Orleans; and I venture to predict that, before the expiration of three years, the mail will be transported from this city [N. Y.] to New Orleans in the short space of eight or nine days; and that to avoid the rigors of a northern winter, a trip to the sunny regions of the south will soon become as common as the visits from that quarter to the north are in the summer.

But the most gratifying part of the details—and that which, as an American citizen, and a member of this great republic, most flatters my vanity—is the proud recollection that the whole of this trip, from the city of New York to Saratoga, from Saratoga to the interior of Virginia, near the North Carolina line, and thence again to this city, making the distance travelled more than fifteen hundred miles, was performed by railroad, and the splendid steamboats which ply on the noble waters of the Hudson, Delaware, Chesapeake Bay, and James river, without any *fatigue* or *sacrifice of personal comfort, in the short space of nine days*, including a detention of nine-sixty hours, or four days, at the different places I visited, making the travelling time but *five days* for the whole distance.

Yes, Mr. Editor, I think every American citizen may justly feel proud, when he reflects on the rapid progress of these facilities of internal communication, which are so rapidly springing up on every side, and intersecting our country from north to south, and from east to west, forming the great avenues of intercourse with every part of our extended confederation, and which alike strengthen the bonds of our happy union, and give an additional guaranty for the stability and permanency of our government and institutions.

SUPPOSED EFFECT OF ELECTRICITY ON VEGETATION.

From Madden's Infirmities of Genius.

The influence which electricity exerts over vegetable life, till very lately, has been overlooked, and even now the same fashion which domineers in academies as well as in boudoirs, has ren-

dered the doctrine of animal, or rather vital electricity, as apparently ridiculous as that of electro-chemical agency was considered, before Davy, by its means, changed the whole face of that science which he so nobly cultivated. Nothing, perhaps, has tended more to the discredit of this theory, than the inordinate expectations which medical electricity called forth some forty or fifty years ago, when it was ushered into practice as a universal remedy, and which shared the fate of all new remedies whose powers are overrated, abused, and ultimately decried. But of late years, on the continent, the influence of the electric fluid or vitality has again forced itself on public attention; and in the south of France, we have seen whole vineyards in which numerous electrical conductors were attached to the plants, for the purpose of increasing the progress of vegetation, and of invigorating the vines.

REFUGEE AND EMANCIPATED SLAVES.

[The following extracts will serve to show the progressive and present state of the slaves who were carried from Virginia and the more southern states, by the British fleets, during the war of 1812. The narrative will probably be interesting to many of our readers, as the circumstances relate to those who were formerly our slaves, and it also presents subjects well worthy of consideration for the political economist, the philanthropist, and the statesman.]

From a Subaltern's Furlough.

There is a settlement of negroes a few miles from Halifax, at Hammond's Plains, the commencement of the military road laid out by Sir John Sherbroke, in a direct line to Annapolis, through the dense forest, which lessens the intermediate distance nearly one-third. Any one would have imagined that the government would have taken warning from the trouble and expense it incurred by granting protection to those who emigrated from the States during the revolution, 1200 of whom were removed to Sierra Leone in 1792 by their own request. Again, when 600 of the insurgent negroes, the Maroons of Jamaica, were transported to Nova Scotia in 1796, and received every possible encouragement to become good subjects, by being granted a settlement at Preston, and being employed upon the fortifications at Halifax, yet they too soon became discontented with the climate, and, being unwilling to earn a livelihood by labor, were removed in 1800 to the same colony as their predecessors, after costing the island of Jamaica more than 45,000*l.*, and a large additional sum to the province. Notwithstanding all this, when the runaway slaves were received on board the fleet off the Chesapeake during the late war, permission was granted to them to form a settlement at Hammond's Plains, where the same system of discontent soon arose. Many of the settlers professing they should prefer their former well-fed life of slavery in a more congenial climate, and earnestly petitioning to be removed, were sent to Trinidad in 1821. Some few of those who remained are good servants and farmers, disposing of the produce of their lands at the Halifax market; but the majority are idle, roving, and dirty vagabonds.

AMERICAN REFUGEE SLAVES.

From Blackwood's Magazine.

The American refugee slaves are the next class who deserve notice. They have been settled in Trinidad, and consisted, I believe, on their arrival there about eighteen years ago, of 1100 men, 309 women, and 217 children; altogether, 1626. These were, I believe, principally field slaves, or agricultural laborers, when in the United States. Great Britain paid these states, for these people, the sum of twelve hundred and fifty thousand dollars, making, with the expense of the commission at St. Petersburg, attending the reference to the Emperor of Russia, and the additional expense of transporting them from America to Trinidad, a sum exceeding 300,000*l.* sterling. Since they went there they have cost the British Government upwards of 30,000*l.* sterling more, besides the value of the land, sixteen acres given to each grown up person, some of it in cultivation of provisions, cocoa, &c., above, if land is to be taken worth any thing, 60,000*l.* more; or together, 400,000*l.* sterling on this free labor speculation. I passed through a part of their location in January last, and have collected a particular and accurate account of the whole. They have done nothing: they are scattered, and utterly demoralized.

These people were located in the vicinity of *Savannah-le-Grande*, the most fertile part of Trinidad. They were settled in companies in a military way. The cultivation of provisions for their own supply, and some product for exportation, as directed by Sir Ralph Woodford, was abandoned in consequence of orders from England. Mr. Mitchell, their superintendent, with a salary of 400*l.* sterling per annum, endeavored to keep them all at work on his own estate, by persuading them that they would not get paid if they wrought on any other. He had then an estate with about thirty slaves, yielding a fair return, and clear of debt. About this time he sent to England some sugar, as he said, the produce of *free labor*, about which a great noise was made. The fact was, that notwithstanding his unlimited authority, and the application of the whip, to the extent that the flagellations inflicted amongst these people exceeded those inflicted on all the sugar plantations in the districts of both Naparimas, still these people would not work, nor could he obtain any labor from them at a profit, which compelled him to purchase a considerable number of slaves, at a very high rate, in order to carry on the cultivation of his estate. From this cause it got deeply in debt at the commencement of the late ruinously low prices of sugar; and it is now, after his death, in the hands of a mortgagee, and his family left without a farthing! Government discontinued the superintendent at the beginning of last year, since which period these people have begun to scatter themselves all over the country. Only about a thousand of them can be found. They go upon estates where they are supported by the slaves. A few among them occasionally engage in the labor of cutting wood and canes, in order to procure rum and a little salt fish, and such clothes as will cover their nakedness. They drink rum to excess. Those who engage in cutting wood, never drink less than a bottle a-day, and two if they can get it. These people, together with the free Indians and Spanish peons, look with contempt upon an estate that has

not got a still upon it! When they first arrived from America, they were both a moral and religious people. Without teachers, they for a time performed their public and private devotions regularly, and in a very serious manner. With their freedom, however, their religion has vanished. There is now neither church nor school in any of the settlements. The former preachers have degenerated into irreclaimable drunkards. A schoolmaster, lately sent among them, has been obliged to retire, on account of want of success, encouragement and pay, and is now obliged to cut canes, in order to support his existence! The timber which had been cut and dragged a considerable distance from the woods, for the purpose of building a church and a school-house, now lies rotting on the ground. Not one will put a hand to it. Government cruelly neglected these people. They pointedly refused to send them a religious teacher until about eighteen months ago, when the bishop of Barbadoes sent a clergyman with a salary of 300*l.* sterling per annum, for the establishment. When he arrived on the coast, about six miles distant, not one of them, either for love or money, would engage to carry his baggage. It was carried to the settlement by slaves. Disgusted and terrified at what he saw and heard, he only remained among them for a few days, when he left, declaring that nothing could induce him to return or stay among such a set of savages. In fact, the only instructers and helpmates that government sent among them, were a set of dirty, ignorant, and savage Congo women, rescued from the wreck of a Spanish slaveship at Anegada, and sent from Tortola to this settlement in Trinidad, at the expense of £385 5*s.* sterling, to the British treasury.

AVALANCHE IN THE WHITE MOUNTAINS.

Extract from a Subaltern's Furlough.

The Notch, as the term implies, is a narrow pass, six miles in length, at the southern end of the White Mountains, the loftiest of which, Mount Washington, is 6284 feet above the level of the sea; but on each side of the pass they rise only from 1800 to 2000, at an angle of about 45°, forming a valley less than half a mile in width between their bases, and down which the roaring Saco takes its course. The whole extent of their front is furrowed and scarred by the tremendous storm of July, 1826; and the valley, choked up with trees uptorn by the roots, remnants of bridges, buildings, and huge masses of rock piled upon each other in the greatest disorder, presents what might be almost imagined as the wreck of nature. A melancholy and interesting story is connected with this storm, which will for years to come be the cause of thousands making a pilgrimage to the White Mountains. I give it as related to me by one who, though not an eye-witness, was in the immediate vicinity at the time it occurred; it was as follows:—A farmer of the name of Willey, with his wife, five children, and two laborers, occupied a house with a small farm at the upper end of the valley. They were much esteemed for their hospitable attentions to travellers, who, overtaken by night, sought shelter at their hearth, which was the only one in the Notch, their nearest neighbors being at the farm aforementioned, six miles distant. The hills at that time were thickly overgrown with forest trees and shrubs; nor had any thing ever occurred to make them suspicious of the safety of their position, until the descent of a small avalanche, or slide of earth, near the house, in the month of June, 1826, so terrified them by the havoc it caused, that they erected a small camp in what they deemed a more secure place, half a mile lower down the Saco. The summer had been unusually dry until the beginning of July, when the clouds collecting about the mountains poured forth their waters as though the floodgates of the heavens were opened, the wind blew in most terrific hurricanes, and continued with unabated violence for several days. On the night of the 26th of the month, the tempest increased to a fearful extent, the lightning flashed so vividly, accompanied by such awful howling of wind and roaring of thunder, that the peasantry imagined the day of judgment was at hand. At break of day on the 27th, the lofty mountains were seamed with the numerous avalanches which had descended during the night. Every one felt anxious respecting the safety of the family in the valley, but some days elapsed before the river subsided so far from its extraordinary height as to allow any inquiries to be made. A peasant swimming his horse across an eddy was the first person who entered the Notch, when the terrible spectacle of the entire face of the hills having descended in a body presented itself. The Willey's house, which remained untouched amidst the vast chaos, did not contain any portion of the family, whose bodies, after a search of some days, with the exception of two children, were discovered buried under some drift-wood within 200 yards of the door, the hands of Miss Willey and a laborer grasping the same fragment. They had all evidently retired to rest, and most probably, alarmed by the sound of an avalanche, had rushed out of the house, when they were swept away by the overwhelming torrent of earth, trees and water. The most miraculous fact is that the avalanche, descending with the vast impetuosity an abrupt declivity of 1500 feet would give it, approached within four feet of the house, when suddenly dividing it swept round, and, carrying away an adjoining stable with some horses, it again formed a junction within a few yards of the front. A flock of sheep which had sought shelter under the lee of the house were saved; but the family had fled from the only spot where any safety could have been found, every other part of the valley being buried to the depth of several feet, and their camp overwhelmed by the largest avalanche which fell. A person standing in rear of the house can now with ease step upon the roof, the earth forming such a perpendicular and solid wall.

A small avalanche was seen descending from one of the mountains some days after the above occurrence. The thick pine forest at first moved steadily along in its upright position, but soon began to totter in its descent, and fell headlong down with redoubled fury and violence, followed by rivers of floating earth and stones, which spread over the plain, carrying devastation far and wide. The long heat of summer had so dried and cracked the ground that the subsequent rains found easy admission under the roots of trees, which, loosened by the violence of the wind, required but little to set the whole in motion. There was no tradition of a similar descent having ever taken place; but, upon a close examination, traces of one which had

evidently occurred more than a century before could be discovered amongst the forest.

BARNABY GOOGE'S "WHOLE ARTE AND TRADE OF HUSBANDRY."

From the Farmers' [Edinburgh] Magazine.

As you were pleased to express your approbation of the account I gave you of 'The Boke of Husbandry,' by Fitzherbert, I sit down to fulfil my promise to send you a similar analysis of an agricultural work printed in 1577, translated from the German of Conrad Heresbach, by 'Barnabe Googe, Esq.' Before I begin, however, I will just observe, that I think I have found a very satisfactory account of Fitzherbert and his book, which clearly proves to me that he flourished in the reign of Henry VIII, as a Justice in the Court of Common Pleas, and died in 1538. Now, the date of my edition is 1555, consequently, though this particular copy is not so valuable (being, as I had conjectured, a later edition,) yet there is little doubt that the work itself was first published in 1531, or 118 years instead of 97 years, as I had asserted, before the publication of Blyth's 'Improver improved.' Respecting the doubts which have been raised as to the real author of 'the Boke,' the following extract from Chalmer's Biographical Dictionary may throw some light upon the subject. It was published first 'in 1534, and several times after in the reigns of Mary and Elizabeth. It is said, in an advertisement to the reader, that this book was written by one Anthony Fitzherbert, who had been forty years an husbandman; from whence many have concluded, that this could not be the Judge. But, in the preface to his Book "Of Measuring Lands," he mentions his book "Of Agriculture;" and, in the advertisement prefixed to the same book, it is expressly said, that the author of that treatise of "Measuring," was the author of the book "concerning the Office of a Justice of Peace." Whence it appears, that both those books were written by this author.'

Barnaby Googe, the translator of 'the Whole Arte and Trade of Husbandrie,' is supposed to have been born about the time Fitzherbert died, viz. 1538. He was a relation of Sir William Cecil, Queen Elizabeth's minister, and had distinguished himself by many poems, particularly a volume of 'Eglogs, Epitaphes and Sonnetes,' now very rare. He was also much given to translating, both in verse and prose; and, in 1577, produced the volume before us. It is printed in black-letter quarto, by Richard Watkins, and contains 193 folios. The work consists of four books, the *first* 'entreatyng of Earable Ground and Tyllage.' 'of Pasture Ground and Tyllage,' and 'of the Order of Harvest;' the *second* 'entreatyng of the Order of Gardning' of the Ordrynge of Orchardes,' and of the Ordring of Woodde s; the *third* 'entreatyng of Cattell;' the *fourth* 'entreatyng of Poutry, Foule, Fishe and Bees.'

It is a sort of dialogue, and for quaintness and simplicity, reminds us of Walton's Angler. After describing the various occupations of an husbandman, and bestowing suitable commendation on husbandry, both for its antiquity and 'woorthinesse,' Cono (the farmer) proceeds to describe the different parts of his house and offices; after which, his friend Rigo asks him, "I pray you let me haue your opinion of the feeld, and the tilture thereof; for I see you are a perfect husbande, and nothing unskilfull. I have a great desyre to heare some rules, and such as serue our turne best."

Cono. "If it be a shame for an apprentice at the lawe, and a pleadar of causes, to be ignorant of the lawe wherein he dealth, a greater shame is it for a professor of husbandry to be unskilful in the ground whereon his whole trade lyeth. Howe is he able to judge uprightly in husbandry, that knoweth not whiche way to tyll his lande? The professours of all other arts do commonly keepe to themselves suche things as be the chiefe mysteries of their knowledge. Contrariwyse, the husbande rejoyceth to haue every body made priuye to his skill; and being demanded in what sort he dooth this or that, he gladly declareth his whole dealing in every poynt; Such goodnatur'd men dooth has knowledge make. I have ordered my ground here, according to the diligence of the olde fathers, rather then for the wantonnesse of these times. Therefore I wyl fyrst shewe you their opinions, and afterwards myne owne fancie.'

He then points out the various kinds of soil, with rules for ascertaining the good from the bad; from whence he proceeds to discourse on manures. Speaking of chalk he tells us, "In Germanie, this maner of mendyng of ground is common. But long use of it, in the ende, brings the grounde to be starke nought, whereby the common people have a speache that grounde enriched with chalke makes a riche father and a beggerly sonne." After enumerating the different sorts of grain and pulse he proceeds to point out the various manners of sowing and harvesting them. Among the implements used for this purpose, the *modern* farmer will be surprised to hear a description of a reaping machine! an invention which, anno 1817, is expected *very soon* to be brought to bear; and great credit has been bestowed on the ingenuity of the mechanic for the utility and *novelty* of his invention. Googe, anno 1577, alludes to it as a worn-out invention, a thing "*whiche was woont to be used* in France. The devise was, 'a lowe kinde of carre with a couple of wheeles, and the frunt armed with sharpe syckles, whiche, forced by the beaste through the corne, did cut down al before it. This tricke,' he says shrewdly enough, 'might be used in levell and champion countreys; but with us it wolde make little favored woorke.'

We next come to "the lettying of a farme," on which point our author's remarks are very judicious and liberal. 'In the letting of a farme,' says he, 'this thing is to be obserued, that you let it to suche, whose trauayle and good behauiour you may be assured of, and that you regard more their good ordering of the lande then the rente, which is least hurtful and most gaynefull. For where as the grounde is well husbanded, you shall commonly haue gayne, and never losse, except by unreasonableness of the weather, whiche the civil lawyer sayeth should not be any damage to the tenaunt, or the invasion of the enimie, where the tenaunt cannot helpe it. Besides, the lorde must not deal with his tenaunt so straightly in every poynt, as by the lawe he might, for his rent dayes, bargaynes of woode, quitrents, or suche, the rigour wherein is more troublesome then beneficial: neither ought he to take every aduantage, for lawe many times is right plaine

wrong: neither must ye be to slacke on the other side, for too muche gentlenesse many times makes a man the woorst. And therefore it is good yf the farmer be slacke in his paimentes, to make him to knowe it; but in no wyse to be a rayser or enhaunser of rentes; for that discomfortes, and many times undoeth the tenaunt. Moreouer, you muste not lyghtly change the olde farmer, both because of his desertes, and that he is better acquainted with the grounde then a newe; and therefore I doo like well that order, where the land is let for the lives of the tenaunt, his wyfe and his chylde, paying a yerely rente, so that as long as he payes his rent, and keepes the reparations, it shall not be lawfull to deceiue him: for hereby the tenaunt shal be prouoked to order the grounde with more diligence, to repayre the house, and to looke to it in al pointes as to his owne, bestowyng many times as muche as he hath upon it. And here be sure that you let it rather to one of habilitie, then to an unthriftie man that is not able to beare it, whereby you may loose both your lande and your rent." It would be well if some of our modern landlords, who are not in the practice of granting leases, would pay due reverence to such reasoning.

We now enter upon 'The Seconde Booke, entreating of the order of Gardning;" and, first, for fencing it in, he gives us the following instructions.

"The place that you determine to enclose, must, after ye beginning of September, when ye ground hath been wel soked with rayne, be trenched about with two furrowes, a yard distant one from the other, the deapth and breadth of every one of them must be two foote, which you must suffer to lye emptie al winter; providing in the mean time ye seedes that you meane to sow in them, which must be the berries of sharpe thornes, bryers, holly, and wyldey eglanttine, or dogge bryer. The berries of these you must geather as ripe as you may, and mingle them with the floure or meale of tares, whiche when it is sprinkled with water, must be put upon olde ropes of ships, or any other rope; the ropes being thus handled, and dryed, muste be layed up in some boorded floore. Afterward, when winter is doone, within fourtie days after, about the coming of the swallowe, yf there be any water remayning in the furrowes, it must be let out, and the mellowed earth, whiche was caste out of the furrowes in the ende of sommer, must nowe be cast in agayne, till you haue fylled them up to the middest; then you must handsomely unfolde the rope, and lay them in length throwe both the furrowes, and so cover them, taking good hede that you throwe not to much earth upon them for hindering the spring, which commonly useth to appear within thirtie dayes after; and when they be growen to be of some height, they must be made to incline to the space betwixt the two furrows; in which space you must haue a little walled hedge, to teache the springes of other furrows to climbe by, whiche wyl be a jolly stay and a comfort to them."

He then describes "a newer and better way," by planting young shoots, or springs, instead of seeds, on the face of the bank, plashing them, &c.; and which differs but little from the modern method of raising quick hedges. Having enumerated almost all the various kinds of flowers, the author proceeds to treat of the management of orchards, fruit-trees, &c. &c. The cultivation of the vine is particularly enlarged upon; a subject more entertaining than useful to the English reader.

The 'Third Booke entreateth of Cattel, and first of the Horse;' the natural history, diseases, &c. of which are stated with great accuracy and judgment. The following directions ought to be attended to by all 'of every age.'

'You must not suffer your horse to drinke after his journey, tyll he be colde: howbeeit yf he sweate not to extreamly, and be ridden soone after, it is not so daungerous: it is farre better to let him thyrst, then to give him colde water yf he be hotte. If a horse haue long rested, he is not to be trauayled upon the sudden, eyther in galloping or long journey, but to be laboured faire and softly at the fyrst. A horse that is weery or tyred, wyl be wonderfully refreshed yf he may wallow himselfe eyther in the stable or other dry place out of the wynde and rayne,' &c. &c.

We have next a dissertation on the uses and treatment 'of Bullockes,'—'some of which, says he, are for ye drawght, some for the staull, and some for the payll.'—'The wordes of couenaunt in the olde time (as Varro saith,) in selling of bullocks, were these—Doo you warrant these bullocks, or steeres, that you sell, to be sounde, of a sound hearte, and without fault? The butchers that bye for slaughter, and such as by for sacryfises, use no worde of warrantise.'

On breaking them in, he gives the following directions—Fyrst of all, see that you haue a large roome where the breaker may easily goe up and downe, and out at his pleasure, without any daunger. Before the stable, you must haue a fayre feelde, that the steeres may haue libertie yenough, and not be feared, or haltred, with trees or bushes. In the stable, you must haue certayne stalles, or boordes, yokewyse set up, a seuen foote from the grounde, to which the steers may be tyed; this doyne, choose you a fayre day for the purpose, and taking them up, bring them into the stable: and if they be unreasonable wylde and curst, let them stand tyed a day and a night without any meate, to tame them withall: afterwardes, let him that keeps them offer them a little meate; not sideways, or behinde, but before, coying them all the whyle, and speaking gently to them, stroking their backes and their moosels, sprinckling them with a little sweete wine, taking good heede that they strike him neyther with head nor with heele: for yf he once get that tricke, he wyl neuer leaue it. Thus being a little acquainted with him, you shall rubbe his mouth with salte, and let downe into his throate certayne lumps of salt tallowe, and powring after a quart of good wine, whiche wyll make him, in three dayes as goode a fellowe as you woulde wishe him to be. Some use to yoke them together, and let them drawe some light thing, or plowe in a light plowed grounde, that their labor hurt not their neckes. The redyer way of breaking them, is, to yoke them with an olde oxe, that may easely instruct them: yf he happen to lye down in the furrowe, doo neyther beate him nor fear him, but binde his feete together, and let him lye, that he may neyther sturre nor feede: whiche being well punished with hun-

ger and thyrste, will teache him to leave that sullen tricke."

Next comes the management of cows, with the various ways of making cheese. "Cheese is also made of the milke of cattell, the milke being powred into a vesseli of earth, putting into it a little rennett, the quantitie of a walnutte, in a great vessell of milk, wherby it turneth into curd. Varro dooth better like the rennett of the levret, or the kydde, then the lambes, howbeit we commonly use the calues rennett: others use sundry other meanes only with heate, warming it in tinne vessells, and after dipping these vessels in cold water, which is the sweetest and cleanliest maner: others put in the seede of wylde saffron, and being so turned, the whay dooth greatly purge fleame; others again use the milke of the figge tree, and then dooth the whay purge both choler and fleame; some turne it with oxymell, or syrope, of uineger, which is of all other wayes the holsomest; some besides, use the little skinne of birdes guysardes, and others the flowres of wylde thystels or hartichockes." The above may perhaps serve as a hint to some of our modern dairy-women, and teach them, if not a substitute for rennet, at least a less bountiful application of it to their cheeses. Speaking of the different sorts, he says, 'In our dayes, the best cheeses are counted the Parmasines, made about the river of Po, esteemed for theyr greatnesse and daynetinesse, of which you shall haue brought into other countries that way aboue three score pounde." Next are commended the Holland cheese, the cheese of Normandy, and the English cheese. "In England the best cheese is the Cheshyre, and the Shropshyre, then the Banbury cheese, next the Suffolke, and the Essex cheese, and the very worste the Kentishe cheese. The places where the best cheese is made, appeareth by this olde Englishe *distichon*, better sensed, then looted.

"*Banbury, Langtony, Suffolke good cheese, Essex go thou by, Shropshire*
Cum *Cheshyre, Hertford may well with the best peere.*"

"Of the discommoditie of Essex cheese, our Englishe Martial, John Heywood, thus meeryly wryteth:

"*I never saw Banbury cheese thycke yenough,*
But I haue sene Essex cheese quicke yenough."

Next follows a dissertation on Pigs. "Euery pigge," he says, "doth knowe his owne pappe that he was borne to; and sucketh onely that, and none other; yf you take away the pigge, the pappe dryeth, as both *Plinie* and experience sheweth. They were woont to be bought and bargained for in this sorte. Doo you warrant that these swyne are sound, that I shall well enjoy them, that you wyll answere the faultes, and that they be of a healthy breede?"

From Pigs we get to Dogs and Cats, and then enter upon the Fourth and last Book, "on Poultry Foule, Fishe and Bees."—Much useful information is here developed, particularly with regard to the first article, and on the management of Pigeons. 'They haue many aduersaries, crowes, dawes and owles, which all destroy the pigions, specially when they breed. I founde of late in myne owne dovehouse, an owle sitting solemnly in the nest upon her egges, in the middest of all the pigions, and hard by the house in an olde, hollowe tree, I found peeces of young pigions, that the owles had brought to feede theyr young with; and though the owle seeme to be greater than the pigion, by reason of the thicknesse of her feathers, yet wyll they creepe in at as little a place as the pigion wyll, so small and little is theyr bodyes, though they be bombased with feathers."

I have thus introduced you and your readers to my old friend Barnaby; perhaps they are already tired of his company, and therefore he shall say very little more for himself; and all that I shall say for him shall be condensed as much as possible. Were I to draw a parallel between this work and Fitzherbert's, I should say that Fitzherbert's, though the earliest of the two by more than 40 years, and considerably the least volume, is the best *practical* treatise. It is, in fact, a plain statement of *the writer's* experience. Googe's, on the contrary, is only a *translation*, and deals in many articles not interesting to an English farmer, such as vineyards, citrons, pomegranates, and the like. A superstitious veneration for the writers of antiquity likewise pervades the book, and constant reference is made to authorities which a modern farmer would but smile at, so great is the prevalence of incredulity. For instance, 'the colicke, or pain in the belly (in oxen,) is put away in the beholding of geese in the water, specially duckes; for the sight of the ducke, as *Vegetius* and *Columella* say, is a present remedy to this beast. *Florentinus* is of that fancie, that he woulde your number of sheep should rather be odd than even, thinking that more fortunate for the healthinesse and long continuance of the cattall.' He seems, indeed, rather inclined to question the authority in this instance, for he goes on to say, "but these are superstitious toyes, as are a great 'number of others imagined by the faithlesse.'—Not so, however, the following nostrum. "*Hieronimus Tragus* teacheth for a horse, If he be sicke, and suddenly fall downe of a disease that you know not, put under his tongue a peece of a ferne roote, whereupon you shall see him immediately voyde, upward and downward, whatsoever is in his body, and presently amende: This he sayth (*and truely I beleeue him*) that he proued with a horse of his owne.' The farmers of the present day (however old fashioned,) would stare to be told, that tares must not be sown 'before the moone be 24 dayes olde, otherwyse the snayle wyll devoure it. His tyme of sowing is, as Plinie wryteth, at the setting of the starre called the Berward,' &c. &c.

These, and a number of other similar instances will prove to the reader of the present day, that he must not place implicit confidence in *every thing* he meets with in the book. There is a great deal of good in our author, but he requires sifting.

I remain, sir, your most obedient servant.

S. TAYLOR, Jun.

Ditchingham, July 17th, 1817.

GATHERING AND PRESERVING FRUIT,

From the American Orchardist.

Various theories have been offered for preserving apples in a sound state for winter use, or for distant voyages. Some have proposed gathering the fruit before it is ripe, and drying it on floors before it is put up: this has been tried; apples lose their sprightly flavor, and keep no better than by some less troublesome modes. Dr. Noah Webster

has recommended that they should be put down between layers of sand that has been dried by the heat of the summer. This is, without doubt, an excellent mode, as it excludes the air, and absorbs the moisture, and must be useful when apples are shipped to a warm climate. But apples thus preserved are liable to imbibe an earthy taste.

Chopped straw has also been highly recommended to be placed between layers of fruit; but I have noticed that the straw, from the perspiration it imbibes, becomes musty, and may do more hurt than good. When apples are to be exported, it has been recommended that each be separately wrapped in coarse paper, in the manner oranges and lemons are put up. This is, without doubt, an excellent mode. And Mr. Loudon has recommended that apples destined for Europe should be packed between layers of grain.

Great quantities of winter fruit are raised in the vicinity of Boston, and put up for the winter use, for the market and for exportation. The following is the mode almost universally adopted by the most experienced. And by this mode the apples, under very favorable circumstances, are frequently preserved in a sound state, or not one in fifty defective for a period of seven or eight months. The fruit is suffered to hang on the tree to as late a period as possible in October, or till hard frosts have loosened the stalk, and they are in danger of being blown by high winds; such as have already fallen are carefully gathered and inspected, and the best are put up for early winter use. They are carefully gathered from the tree by hand, and as carefully laid in baskets. New, tight, well seasoned flour barrels from the baker's, are usually preferred; the barrels being quite filled are gently shaken, and the head is gently pressed down to its place and secured. It is observed that this pressure never causes them to rot next the head, and is necessary, as they are never allowed to rattle in moving. No soft straw or shavings are admitted at the ends; it causes mustiness and decay. They are next carefully placed in wagons and removed on the bulge, and laid in courses in a cool airy situation, on the north side of a building, near the cellar, protected by a covering on the top of boards, so placed as to defend them from the sun and rain, while the air is not excluded at the sides. A chill does not injure them; it is no disservice; but when extreme cold weather comes on, and they are in imminent danger of being frozen, whether by night or by day, they are carefully rolled into a cool, airy, dry cellar, with an opening on the north side, that the cold air may have free access—they are laid in tiers, and the cellar is in due time closed, and rendered secure from frost. The barrels are never tumbled or placed on the head. Apples keep best when grown in dry seasons and on dry soils. If fruit is gathered late, and according to the above directions, repacking is unnecessary; it is even ruinous, and should on no account be practised, till the barrel is opened for use. It has been fully tried.

CULTURE OF SILK.

From the New Hampshire Spectator.

The culture of silk has of late been suggested to the American people as affording a prospect of reward to the cultivator of the New England or the Eastern States. If you think the following experiment worth an insertion in your paper, you may oblige some who wish for more information on this subject. I have made an experiment personally, and can attest the truth of every item that I communicate, for I have kept an exact diary of the whole experiment, and the result. I may be permitted to say in the outset, that I never have had an opportunity of attending any silk worm establishment, and all the previous knowledge I have ever had, before commencing the experiment, was in 1831. I saw one silk worm in the action of winding, and one other on the shelf, nearly ready to ascend the bushes to winter; and in 1832, one or two hundred about ten days old, reared by those who had no previous opportunity of seeing the development of the silk worm, and were as unlearned as myself. This fact is only hinted at to prove that any person may, by diligent care, raise silk, if they never were acquainted with the art; yet, to make it profitable in the end, as in every other species of cultivation, a complete knowledge of the subject is undoubtedly necessary.

On the 20th June last past, my eggs were hatched. I counted out 1500, and a few more to supply the place of those that should die in the several stages, say from 50 to 100. These were uncounted. My calculation was to raise about 1500. By reason of the cold and rainy summer, the worms were retarded in their growth, as will always happen—warm and dry weather being the climate suited to the full perfection of the worm, and facilitates its growth and maturity; yet, the food in either case will be about the same—the only difference will be the length of time required for the insect to eat the same quantity of leaves. The first cocoon was wound on the 38th day of the age of the silk worm. After the fourth moulting, or in other words, shedding of their skin—for they skin four times during their life before they commence winding their balls or cocoons—they are usually about ten days in winding up their cocoons. Previous to their moulting the fourth time, I counted about 1450; so that 50 had died out of the 1500, besides the worms I held in reserve above stated. Of these 1450 worms, beside those that died during this last age of the worm, and during their winding, I counted 912 that remained on the shelves on the 40th day—585 on the 42d day—303 on the 43d day—186 on the 44th day—90 on the 45th day—43 on the 46th day—26 on the 47th day—13 on the 48th day. In ten days from the beginning of winding, all had wound their cocoons, except 13 worms. In four days more, these were all wound. The whole time the silk worms were progressing through their several ages, each age designated by their moulting, including the winding, was 53 days—the usual time is from 42 to 45 days—retarded no doubt from the cold and dampness of the season. There died in the whole 257, during the several ages, till the completion of the cocoons. I had 1243 cocoons of all descriptions, and but few, say 15, that would not reel off. The reserved uncounted worms are not included in this estimate.

The weight of cocoons before reeling, and as soon as they were picked from the bushes, weighed 4 lbs. 5 oz. 20 cocoons weighed precisely 1 oz.

Raw reeled silk,	6½ ounces.
Raw silk,	1¼ ounce.

Making the whole product of silk nearly one half pound.

The weight of leaves consumed and wasted, was 75 lbs.

After I had found the quantity of leaves the 1500 worms consumed, I made a comparison with a statistical table communicated in a letter to the 20th Congress of the United states, by Dr. James Mease, on the method of rearing silk in Bavaria, and found by this table 20,000 silk worms consumed 1000 lbs. mulberry leaves—exactly corresponding to 75 lbs. for every 1500 worms—and that from 7 to ten pounds of cocoons make a pound of raw or reeled silk—from this estimate the product of my experiment nearly coincides, for 4 lbs. and 5 oz. produced 7¾ ounces of silk. Nor does this estimate of consumption of leaves and the product of silk, materially differ from the estimate and exact result of Count Dandolo—transmitted to Congress by the Hon. Richard Rush, then Secretary of State.

It will readily be perceived that the rearing of silk worms in our state is practicable, and with due management equals the product raised in Bavaria, and the careful management in the extensive laboratory of Count Dandolo, where eight ounces of eggs, or 160,000 worms are reared. In this laboratory the leaves are chopped, the thermometer regulates the temperature, and the hygrometer the dampness of the atmosphere; and every measure of precaution used to secure the worms from disease—by ventilation, by stoves, and by cleanliness. On reading these treatises, and observing all the nice directions contained therein, any person would almost shrink from the task, and become discouraged before they attempted to enter a field where so many obstacles seemed to threaten him. I have chopped no leaves—made no fire but once or twice, and then when the weather was extremely cold and damp for the season. I gave them what they would eat, and they appeared to know what to do with the leaves as well as any other insect, and not more at a loss about it.

I am fully of opinion that the culture of silk is as easily learned as any other kind of business or art—and that many families in every town would find as profitable reward for their labor as our rich farmers do, by correspondent care and exertion.

ELIAS FROST.

Plainfield, August 27, 1833.

VALUE OF THE STUDY OF ENTOMOLOGY TO AGRICULTURE.

Extract from an address delivered by the Rev. J. Brachman, before the Horticultural Society of Charleston.

From the Southern Agriculturist.

Entomology, too, a science but little known till very recently, lays weighty claims to the attention of the horticulturist. Wherever we go, we find the earth, the trees, the shrubs, and the air filled with thousands of living beings, assuming the most wonderful changes, and gifted with the most surprising instincts. Some of these, like the silkworm, the cochineal, and the cantharides, add to the wealth or luxury of man, or minister relief to his diseases. Others are destructive of his prospects, and the enemies of his repose. Some attack the roots of his trees and plants which soon wither and die, whilst others fasten upon the blossoms, or upon the fruit, and all his bright hopes are blighted. The fair one who has raised with care and perseverance some favorite plant, finds it drooping and decaying in spite of all her vigilance, and is not aware that a worm may be at its root, or that some insect may visit it at night and deprive it of its buds and leaves; but she knows not the characters of either—she knows not where its eggs are deposited, at what season of the year she may apprehend its attacks, and is utterly unable to guard against it.

When the insect called the Hessian fly made its appearance on Long Island in 1776, it was wrongly conjectured that the Hessian soldiers, under the pay of the British government, had conveyed this evil along with them from Germany. The British government feared that it might be introduced into England, and took measures to prevent it. Information was sought by government from practical men in America, some of whom had lost their entire crop by the insect; and yet they were ignorant whether it was a moth, a fly, or what they term a bug. Expresses were sent to ambassadors in France, Austria, Prussia and America. The information obtained was so voluminous as to have filled two hundred octavo pages, yet still so little science was possessed by the persons who gave information about the insect, and by those who met to ward off its ravages, that it was impossible to form any idea of its genus or character, till Sir Joseph Banks, an eminent naturalist, lent his aid in the investigation, and gave the nation the only information that could be relied on. An insect with a somewhat similar character actually made its appearance in England some time afterwards. It threw the country into great consternation, as they feared that it might prove destructive to the staff of life; when Mr. Marsham, by tracing out the species, proved the alarm to be unfounded. Pursuing the history of this insect again in America, entomologists discovered its character and habits, and by sowing their wheat at a particular time in autumn, when it was too late for the insect to multiply before the cold weather set in, and when the plants would be too much forwarded to sustain much injury in the spring, the cultivators have in a great measure, arrested its destructive progress, and thus science has lent her aid to agriculture, in averting evils which at one time threatened to banish from our land the culture of the finest grain, with the exception of rice, which is found in the world.

The utility of entomological knowledge will farther appear from a circumstance which occurred in Sweden. The oak timber in the royal dockyards had been perforated and greatly injured, when the king sent to Linnæus, the father of natural history, to trace out the causes of the destruction of the timber. He detected the lurking culprit under the form of a beetle, (*Lymexylon navate,*) and by directing the timber to be immersed during the time of the metamorphosis of that insect, furnished a remedy which secured it from its future attacks. Another instance, which occurred among the elm trees in St. James' Park, London, between the years 1820 and 1824, is recorded. These trees suddenly became affected in a very singular manner. The bark fell from the stem and whole rows died. There happened to be a company of soldiers stationed in the Park, and as the trees were barked to about the height of the soldier's bayonet, the suspicion fell on some unfor-

tunate recruits as having occasioned the injury, and they were arrested; but nothing could be proved against them. Persons were now employed to watch the Park at night, but still in the morning, the bark was lying in great quantities around the roots of the trees. At the same time the elms in a grove at Camberwell, near London, were also destroyed. This was ascribed to the effect of gas escaped from pipes used for lighting the road. Legal proceedings were commenced against the company for the removal of the nuisance. In this state of things, William Sharpe M'Lay, an eminent naturalist, profoundly acquainted with the history of insects, was requested by Lord Sidney to draw up a report on the state of the elm trees, for the purpose of referring to the lords of the treasury. He discovered it to be a beetle, (*hytensius destructor*,) belonging to the same genus as that which destroys the pines in Germany. By ascertaining its habits he was enabled to point out a remedy, and the remainder of the trees were preserved.

PRUNING THE ISABELLA GRAPE VINE.

From the New England Farmer.

Pruning the vine.—"Well, neighbor, how does your Isabella promise this season? Not a single grape. Ah, how is that? We sent for Mr. M. last fall—he pruned it so closely that the branches looked like naked sticks, and now we have not a grape to gratify our palate.

"Close pruning is too common in this country; in summer only the unproductive shoots should be taken out, and not these, unless they produce too much shade."—*New York Farmer.*

The above appeared in Vol. xii, No. 10, and I regret to see such pieces inserted in a standard paper like yours without comment from the editor. If this sarcasm on pruning shall pass as deserved, much injury will result to the cause you have evidently at heart: I mean the successful culture of native and other hardy vines. "Mr. M." knew nothing of his business, or the vine had exhausted itself in the previous year's bearing. Any Isabella, and most other hardy vines, pruned judiciously every year according to the age, vigor, and general growth of the plant, and depth and strength of the soil, will every year produce a good crop, much superior to any thing from a vine only slightly pruned in the summer. The reason is obvious to any who have studied the nature of the vine, and attended carefully to its cultivation in this country. It should be divested of its surplus branches in the summer, to admit the light and air to ripen the wood as well as the fruit. An experienced cultivator will be as particular in exposing the branches which are to bear freight the following season, as to any other part of cultivation. Grape vines have a constant tendency to throw out lateral shoots, and if the branches which are intended to furnish the next crop of fruit are not divested of those as they appear, their strength will be found exhausted; and if any fruit appear, its quality will be very inferior.

As soon as the buds are developed in the spring a vine stops bleeding; and in the spring we can cut out all the wood which has perished during the winter, of which there will be a quantity on every vine, native or exotic, and it cannot be expected that the late growth should ripen sufficiently to stand a severe frost. I prefer pruning in the spring because we can then make clean work, and lay in only fine ripe wood; and by doing this work a short time before the buds put forth, the plant receives no injury from bleeding. Most foreign vines will become acclimated and hardy by a discriminating use of the knife.

If you deem this communication worth insertion, I may probably make more remarks on this subject.

Port Carbon, Pa.

IMPROVEMENT IN MAKING FLOUR FOR EXPORTATION.

From the Baltimore American.

Some months ago we published a description of an invention which had been practically applied at the flour mill of Nathan Tyson, Esq. of this city, for the purpose of keeping flour sweet for a length of time in warm climates. The process is simple, but effective, and consists in passing the flour, after it is manufactured, through a heated chamber, the temperature of which is sufficient to expel from it whatever natural moisture or dampness it may contain, without any injury whatever to the valuable properties of the flour, but on the contrary imparting to it additional life, strength and color. Several experiments have been made with flour manufactured in this manner, in order to prove its value, by submitting it to the test of the action of hot climates in various parts of the world. It has been carried on the long voyages around Cape Horn, and was found sweet and sound on arrival; and in some instances, according to recent advices, its peculiar qualities have secured a very handsome profit to the exporter which ordinary shipments could not have realized. We have before us a letter from one of the most respectable houses of Gibraltar, to which a small parcel of this flour had been sent, as an experiment, which contains the following conclusive testimony in regard to it. The letter says—"It is now six months since the landing of your shipment, which has this day been examined by the contractors for the supply of the troops of the garrison, and by them pronounced *as sweet as though just from the mill.*" A letter from a commercial house in Port au Prince, also before us, cites the opinion of a baker of that place who has had some of the flour in his possession for eight months, that "he had no doubt it would keep for a year and be perfectly sweet." In addition to these evidences in its favor, we would advert to the fact mentioned in our weekly review of the markets, in another part of to-day's paper, of the recent sales of considerable parcels for export, at $7 per barrel.

We are induced to notice this matter for the purpose of making more generally known the valuable invention of an industrious and enterprising citizen. It cannot but recommend itself strongly to the attention of those who make shipments to distant ports, or where a hot climate is to be encountered; and we know of none who are more immediately interested in it than the millers of the west, who are obliged to send their flour to the distant market and unfavorable climate of New Orleans. To the latter class, it may be the means of saving, annually, thousands of dollars.

ON THE REARING OF THE SILK WORM, AND CULTURE OF THE GRAPE VINE.

Winnsborough, June 23, 1833.

Dear sir,—A few years since, several persons in this neighborhood paid some attention to the rearing of silk worms, and even to the manufacture of silk on a small scale. I sometimes met my friends with one or more garments of home-made silk, that would compare well with the imported article. Attention to this business seemed likely, at one time, to become fashionable. Some spoke of making extensive preparations for it, and our Agricultural Society, by way of encouragement, imported the *morus multicaulis*, which was pretty generally distributed, and grows with great luxuriance in our soil. Such, however, is the difficulty of overcoming inveterate habit, that the rearing of silk could not obtain a permanent foothold in a single family, although its practicability was established by numerous successful attempts. Many individuals, on account of its very superior quality, compared with the imported, make an abundant supply of sewing silk. This is something gained. I think it is capable of demonstration, that with a good market for cocoons, which I am told may be found in Charleston, at all events in Baltimore, small capitalists, with convenient preparations, by no means costly, would find it far more profitable to raise a crop of them than cotton.

I have for a good many years past attended to the cultivation of the vine; and I have good reason (founded on some experience) to believe, that it may be reared here to advantage. The soil of my vineyard is a stiff red clay, decomposed trap, I plant in large holes about two feet in depth, and fill up with a mixture of loam and sand. In a few instances I have used the scoriæ from the blacksmith's shop, in setting out cuttings, according to the suggestions of Mr. Clarke of Florida. The vines run upon arbors about eight feet high, made of hewn timber or scantling, covered over with long slender pine poles, with the rough bark carefully peeled off. The vines are trimmed close, in the winter months, after the usual method, and so confined to the frames on which they run, as not to be affected by the severest winds. I have never watered nor manured them since they were planted. The hoe is never used except for the removal of grass and weeds. Suckers from the old wood are carefully removed, but the fruit-bearing shoots are never topped, nor a leaf intentionally taken off. I have not failed to raise a good crop of Herbemont's Madeira for 12 years. In some seasons I have had them in great abundance, and in the highest perfection. Bland's Madeira has generally succeeded well, but I think a soil of decomposed sandstone or granite, the proper home of this species. The admirable Lenoir overpays me every year for the attention bestowed upon it. It never rots, and always fulfils its promise to the letter. I cultivate several other kinds which answer tolerably, and which are suffered to remain as members of the vineyard *dum bene se gesserint*. I have extirpated the black Hamburg as a cumberer of the ground. This variety whose origin is uncertain, and which has been so generally reared in the country as the English grape, has done more by its numerous frauds upon the vigneron, to call in question the capability of the state for the production of the vine, than all others. The cuttings, however, live without difficulty, and afford excellent stocks to graft on. I have found by experience, that old vines bear more plentifully, and perfect their fruits more certainly than the younger ones. Those who intend to rear the vine, should, therefore, begin early, and exercise patience. The traveller in passing through this part of the country will find here and there some attention paid to the cultivation of the vine, principally for its fruit: not a few are extending their views further. Cuttings are in good demand every spring. The planting of vineyards, and the making of wine are becoming ordinary subjects of conversation. A half dozen successful examples would wake up our people to the enterprise in good earnest. I am somewhat advanced in years, but I entertain hopes of yet living to see the greater part of my neighbors manufacturing an abundance of good wine for family use, and the bad habit of drinking ardent spirits as a common beverage entirely given up.

Very respectfully, dear sir,

P——.

ORCHARD GRASS.

From the Buck's County Intelligencer of 1831.

The most eligible time of sowing the seed of orchard grass, I am induced to believe, is as early in the spring as the state of the ground will admit; and as clover is the best adapted to the growth of this grass of any with which I am acquainted, they may be advantageously sown together. I have usually sown clover seed at the rate of about four quarts per acre, and afterwards followed with orchard grass with one bushel on the same quantity of ground. This plan has been preferred from a knowledge of the fact, that the latter grass does not generally advance as rapidly as clover, (it not seeding the next season after sowing,) but there is always sufficient of the blades, if the seed takes well, to improve very much the quality of the clover hay. The succeeding season the orchard grass occupies much more space, gradually increasing as the clover declines. The experience of the growers of this grass has shown that the crop improves for at least seven years. Unlike timothy and herd, the bulk of this grass consists in the blades; and of course, when the top is cut for seed, the value of the crop for hay is not much lessened, the part usually cradled being of comparatively small value; but after the seed is gathered, it does not, like the grasses just mentioned, become dead and dry, but continues green and in a suitable state for cutting during several weeks. I have this season mown the stubble which had been standing more than four weeks, and the larger part of it furnished hay of a very good quality; on the other hand I have observed several patches of timothy and herd that have been cut for seed, the stubble of which would not be worth gathering for any thing but manure.

In sowing the seed of this grass, especial care should be taken to distribute it evenly over the ground, it being light, (weighing but about 15 lbs. per bushel,) and easily acted upon by the winds. On an eight pace land four casts should be sown, the sower scattering seed with every step. But it should not be mixed with clover or any other heavy seed, as the difference in *weight* will vary the extent to which a cast will reach. With respect to the quantity of seed per acre, those who

sow with a view of making it the sole object, would probably consult their interest in sowing one and a half or two bushels per acre; but one bushel sown in the manner above mentioned, has been productive of a profitable result, both as respects the improved quality it has imparted to the hay, as well as the seed it has afforded. The appellation of *orchard* has been given to this grass, from its known congeniality with shade. I have known very luxuriant crops to grow in an orchard, producing three cuttings in a season, although the trees were large, and almost entirely shading the ground; but in such situations it will not produce seed.

The *fertilizing quality* of this grass was formerly mentioned, and it may probably be attributed to the circumstance of its shading the soil more effectually than most other grasses, excepting clover. If a field of it should be kept for mowing, there will be very little time during the warm weather in which the grounds will not be protected from the heat of the sun; and if for pasture, unless it be too heavily stocked, the soil will be shaded by a sufficient covering of this luxuriant grass.

It may be mown for hay at any time best suited for cutting the clover with which it grows; but if it is designed to save the seed, the mowing must be deferred till towards the last of June, at which time the seed will be ripe. This should be cradled before it is ripe enough to waste, bound in small sheaves, and shocked in rows. The stubble may then be mown immediately, or to suit the convenience of the farmer, the seed requiring some exposure to the weather to render it in a suitable state for thrashing.

I subjoin the following analysis, contained in Sir Humphrey Davy's Agricultural Chemistry. The quantity of grass from which the estimate is made, grew on a spot of earth contained in four square feet, in a garden attached to Woburn Abbey. The soil was selected, as best adapted to the culture of said grass—a circumstance which may account for the great burden obtained for the estimate per acre.

Dactylis Glomerata—Round-Headed Cocks-Foot Grass, (or Orchard Grass.)

	lbs. per acre.
Grass in flower—rich sandy loam,	27,905
When dry, - - - -	11,859
Nutritive matter, - - -	1,089
At the time the seed is ripe, grass,	26,544
When dry, - - - -	13,272
Nutritive matter, - - -	1,451
Rowen grass, (or 2d crop,) -	11,910
Nutritive matter, - - -	281

This analysis is given as a mere matter of curiosity, as the climate of England, differing so much from this, must make a great difference in the result. The time of the first crop's growing in that climate continues to a period of one month beyond the same growth in this section of the United States; and hence the Rowen or second crop might be expected, (as the result shows,) both inferior in bulk and quality to what it is in this country.

SHEEP HUSBANDRY, NO. I.

From the Columbia (Kinderhook) Sentinel.

Sheep husbandry is that sort of farm management which relates to or has sheep for a principal object. There are various modifications of this kind of farming, depending upon the difference in the circumstances of the lands, their nature and situation, as well as other local causes. In Europe this business has been entered into with all the modifications of which it is susceptible. All the varieties of sheep, of which there are many, have been carefully and distinctly cultivated, the profits of each kind as nearly as possible ascertained, the improvements from crossing the different varieties carefully noted, and the number that each farm which is in a course of arable or other tillage, according to its size, can profitably maintain. They have a system about the whole management which results in certain profits to the owner of the farm, whilst the farm itself is annually improving. Sheep are animals of the utmost importance to mankind, whether considered in the light of food or clothing, or in that of the vast improvement and profit which they produce in the various systems of management to which they are subjected by the ingenuity of man. In some instances they constitute a very large proportion; in others, nearly the whole of his dependence and support. There is another point of view in which they appear equally advantageous; and that is upon lands that must otherwise be nearly if not wholly useless. True, cattle will do tolerably well on land of this description, but not as well as sheep; and if the first afford us food, the latter give us both food and clothing.

I do not intend at this time, however, to take a detailed view of the manifold advantages of sheep husbandry, or the profits that arise in stocking an entire farm with them, to the exclusion of other kinds of tillage. It is my purpose to take only a glance at the present method adopted by our farmers, who all keep a number proportionate to the size and capacity of their farms, while they are under a course of arable tillage. Upon this point, I am happy to say that I think we are manifestly improving, not only in the qualities and general appearance of our flocks, but in their increased number. Sheep husbandry to an extent to which a farm is susceptible, whilst a large portion of it is likewise ploughed and sowed, is one of the greatest of modern improvements. We have already seen how, and profitably too, this is managed in Europe. We have only successfully to carry out the plan here, and we are yet little aware of what will be the extent of the benefits of the practice. Sheep not only enrich a farm, but they prepare it for our best crops of grain. They seem to cleanse and purify a soil better than other animals, and a fallow cannot be rendered more suitable for wheat, than by giving them the range of it; for they destroy almost all weeds; and the quack or couch grass, so injurious to our wheat crop, is more certainly obliterated by them than by any other animal whatever. Besides, they are a sure return to the farmer; and if his crops of grain by drought or severe winters, are cut off, it is not so with his mutton and wool, as his sheep never fail to produce these, and what is more, while man must have food and clothing, the farmer's mutton and wool will command a price, as they are articles that can always be sold and a cash return made sure. Ought not a farmer, then, carefully to cultivate this species of stock, and to ascertain almost to a certainty how many sheep his farm can keep, and keep well. Upon this he may likewise depend, the better his farm is cul-

tivated, the larger number he can supply with good wholesome food; and vice versa, a poorly cultivated farm is soon overstocked. I say therefore to the farmer, manage your farm well, and keep as large a stock of sheep as it can well support; you will receive a much larger profit than from the old method of having a few miserably starved sheep, raising a large number of cattle, with a barn filled in winter with mares, young horses and colts. Of all the methods of farming, the last, of which we have had an ample experience, is the most unprofitable. According to the old plan the hogs ate up the corn, the negroes the hogs, and the mares and colts the hay, so that the farmer had nothing but the negroes and horses left, for whose support it was his constant business to labor. The negroes, thank God, have all been liberated: the horses are now limited in number and put to profitable uses, and the former starveling sheep are now carefully nursed--their numbers increased—their qualities improved—and what is the effect of the change? Our land is worth twice as much per acre as before; simply because it produces nearly three times as much grain. We have better fences, houses and barns—better horses and cattle—the comforts of life vastly increased—intelligence more general—education more common and more thorough; in fine, we are physically and mentally improved—every thing around is improved, and the prospect continually brightening. If we have now commenced the correct system of farming, let us carry it out to its full extent, and by perseverance we must make our farms generally worth $100 per acre, and they will be so when we can make them bring in that interest free of expense. Whether the *kind of sheep* usually grown here is most profitable, must be the next subject of inquiry; but I must leave that for a succeeding number.

A.

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SHEEP HUSBANDRY, NO. II.

In a former number, I took a general view of the benefits of sheep husbandry, in connexion with farm tillage. I noticed, first, the systematic manner in which it is attended to in Europe, with its results. Secondly, the introduction of more enlightened ideas upon the subject here; and thirdly, the greater profits that have followed the practice thus far, when compared with the method formerly in use among our farmers. I refer to these distinct points, and wish the reader to bear them steadily in mind. Not that I mean to press them farther at this time, but, believe me, judicious sheep husbandry is the cornerstone of profitable farming; and to this principally may be attributed the increased value of Dutchess county land. The subject for consideration at the present time is, whether the *kind* of sheep usually grown here is the most profitable. The profits arising from sheep husbandry are of two kinds, direct and indirect. It is the direct profits, that is the sale of the mutton and wool, which is now to engage our attention; and our aim is therefore to have a good sized carcass with a heavy and fine fleece of wool. Have we attained either or both of these objects? I answer, no. Generally speaking, we are very deficient in both, and both of course are susceptible of great improvement. The sheep usually grown here are the native, with a slight cross of the Merino. The native sheep we all know have light carcasses, with no great propensity to fatten, and coarse wool with seldom over three pounds to the fleece. These have been crossed with the Merino, which has added a little to the fineness of the wool, but not to its weight; at the same time it has made the carcass of the sheep rather lighter than it was before. The consequence is that it has not added to the profits of the farmer, and certainly none to the hardiness of the animal. The quarters usually do not exceed 10 or 12 lbs. to a full size sheep; so that the carcass would weigh say from 40 to 48 lbs., and the wool 3 lbs. Comprising these weights with those of the different English varieties, we will be the better enabled to form a correct judgment how far an improvement might carry us. It is essential that we do this; for if sheep husbandry is the basis of good farming, it is of the utmost importance that we have the most profitable kinds of sheep. The annexed table, which is taken in part from a late English publication, will give a clear view of the subject; and although they may be surprised at the difference in weight of both fleece and carcass, when compared with ours, yet we must make due allowances for the better manner in which the former have been kept.

BREEDS AND VARIETIES OF SHEEP.

Names of Breed.	Weight of Fleece.	Wethers per qr.	Age when killed.
Native or kind in common use*	4 lbs.	12 lbs.	4 years.
Teesewater†	9 lbs.	30 lbs.	2 years.
Lincoln†	11 lbs.	25 lbs.	2 years.
New Leicester and Dishley‡	8 lbs.	22 lbs.	2 years.
Cotswold‡	9 lbs.	24 lbs.	2 years.
Romney Marsh‡	8 lbs.	22 lbs.	2 years.
Bampton‡	9 lbs.	25 lbs.	2 years.

I trust that in the above is presented a clear view of the subject; and if the authorities from which I have quoted can be relied on, (of which I have not a doubt,) it is high time that we look a little closer to our interest in this matter. If an improved breed will give us twice as much profit as the present one, the farmer who now realizes $125 from his sheep, with the same trouble, but a little more immediate expense for the first purchase, would from the same number realize his $250. As there are some of the English varieties already here, a simple comparison with the eye of the Teesewater, or the new Leicester and Dishley, will at once show the great difference in the proportions of the respective animals. The native sheep are not well proportioned, and there is not even a uniformity of make in them, some of them being long-legged, some short, with thick heads, big bellies, narrow shoulders and plenty of projecting bones, with here and there one that has a propensity to fatten; but this last quality is purely accidental. On the contrary the better breed is the reverse of all this; their carcasses will weigh double, the wool nearly so, and all have a propensity to fatten and are selected in part for this very quality. They are, besides, a well proportioned animal, and at the same time that they fill the purse, the sight of the animal will please the eye.

*Wool coarse and not long.—†Wool long and course ‡Wool long and fine.

We may take it as a settled rule, that the more perfect an animal is in all its proportions, the nearer it comes to answer the purposes for which it was designed; and a well proportioned animal has evident advantages over one of the same size that is somewhat disproportioned. The reason is, in the first there is a perfect development of its parts, and every organ performs its functions naturally, easily and properly. In the second, wherever there is a variation from a perfect shape, there is some defect, the organization in that part is not perfect, the circulation is not free, there is some compression which tends to disarrange some of the other organs, and all the secretions and excretions of the body are not regularly performed. This disarrangement may not constitute ill health, but it may be enough to make the animal not so suitable to fulfil the purposes required of him by man. For instance, he may not fatten easily, and the most careless must have observed that all animals with which we are acquainted, fatten quick as they approach the point called symmetry. We see it so in a remarkable manner in the sheep, the ox, the horse and the hog. Whichever of these animals we raise, therefore, fine shape is all important. I speak not so much in regard to their appearance as to their profit.

Now we will rest for the present, and the next subject of inquiry shall be, whether it is more profitable to the farmer to raise the fine or the coarse woolled sheep; or, in other words, to raise sheep for the mutton and wool, or for the wool only.

A.

Note.—I should do injustice to myself in the illustration of my argument—to the public and my neighbor whose observation I am to quote, were I not to mention that he having long thought that an improvement might be effected by judicious crossing of our native sheep in the weight of the carcass and fleece, has for ten years been testing his plan. He has succeeded so far, and that without any admixture of the foreign varieties, that his lambs will weigh per quarter from 12 to 13 lbs., and the average weight of the fleece from his flock is between 4 or 5 lbs. The wool however is coarse. This defect must be remedied by selecting from the foreign varieties, a large sheep with fine wool. The gentleman above alluded to sells his fat sheep and lambs in market for at least one third more than the ordinary price.

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SHEEP HUSBANDRY, NO. III.

In my last number, I endeavored to establish the position that the farmers generally, who grow sheep for the mutton and wool, have not yet obtained the most profitable kind of animal for that purpose. The next subject of inquiry is, whether taking the quality of the native sheep as they now are, the growth of them affords as much or more profit to the farmer—who keeps a small flock only to fill out the number of his stock—than it would be to raise the Saxon or Merino on account of the fineness of their wool. I know of no better way to come to a correct conclusion than simply to compare the first cost of each animal with the expense of keeping and the profits.

A native ewe will cost say - -	$1 50
Interest for one year - - - - - -	10—1 60
The profits will be 3½ lbs. of wool at 45 cts. per lb. - - - - -	$1 57
Lamb, - - - - -	1 25
Ewe when fattened, - - -	2 00—4 82
Profits, - - - - - -	$3 22
A full blooded fine Saxon and Merino ewe will cost say - - -	$3 50
The profits will be 3 lbs. of wool which will sell at say 60 cts. per lb. - -	1 80
The chance for a lamb is one half its value, *i. e.* only one half of the ewes have a lamb, and if a lamb is worth $1 75, we allow -	88—2 43

Deducting the interest on $3 50 for one year leaves $2 43 as the gross amount of profit. The annual profit on the native sheep is $3 22, and on the fine woolled it is $2 43. Thus a balance is left in favor of the coarse woolled or native sheep of 79 cents.

In the above comparison I have allowed 15 cents as the difference in the price of wool between the coarse and fine woolled animal, but if we go back for the last five years we will see that the actual sales of fine wool have approximated much nearer than that sum, and I do not think 10 cents would vary much from the real amount. This may be considered an additional argument in favor of the native sheep. For the native sheep however I have given credit for a lamb positive. This to be sure is not always the case, but is much more sure than it is in the Saxon and Merino, for in a flock in the last named, near one half of them will commonly go farrow. I account for the last circumstance from the fact that the buck is not put to the latter until late in the fall when the ewes have got over their heat; for it is all important in fine sheep, which are considered of tender constitutions, not to have lambs too early in the spring. With a native ewe, however, the buck is generally put a month earlier, and of course the chance for a lamb (other causes being the same) is much greater. We see there is a great difference in the first expense between a common and a fine ewe, the latter costing more than double the price of the former, and as we have taken only the interest of this into calculation, the chance therefore of losing the one may be put against the chance of having a lamb from each native ewe. Again the fine sheep do not often have lambs until the third year, so that until then the only profit from them is in the wool, whereas with the native sheep the ewes often have lambs when they are one year of age.

It is manifest therefore that the difference is entirely in favor of the common sheep, and more money may be made in growing them by farmers, who do not entirely stock their farms with sheep, than to have the more expensive Saxon and Merino. Sheep for mutton and wool likewise give the most sure and speedy returns. Their wool is much sooner bought up, as there are ten purchasers for coarse where there is one for fine wool, and a lot of lambs or fat sheep are always in demand, the difficulty not being to sell them, but to keep them long enough to put them in proper condition for market.

The expenses of keeping the two kinds of sheep I have assumed to be the same, but the truth is the Merino are the most expensive if they are kept as they ought to be, and were the latter wintered as most of our farmers in this vicinity winter their native sheep, one half of them would not live until the succeeding spring. Were farmers however to stock an entire farm with the native sheep, to the

exclusion of cattle and tillage, and expect to realize the profit above mentioned from them, they would be disapponted, for, in that case, by crowding so many on a farm, the lambs would not be so valuable, and the sheep would not fatten with facility, which would lessen if not cut off two great sources of revenue.

The result of my inquiries therefore is, that those farmers who plough and sow and keep horses and cattle, and only fill up the remainder of their farms with as may sheep as they can keep well, it is to their interest to have the common kind in preference to the fine sheep, because they can make a profit on both mutton and wool. But on a farm intended only for grazing, and where we do not mean to fatten either young or old, but keep sheep simply for the sale of the wool, and when it is an object to have as many on a farm as it can sustain, the Saxon and Merino, on account of the superiority of their wool, are of course the most valuable. I wish to have it borne in mind however, and hope to see it generally carried into effect, that the native sheep both in their mutton and wool are susceptible of great improvement. Much more might yet be said upon sheep and sheep husbandry that is interesting to the farmer and wool grower, but whether I shall undertake it, time and circumstances must hereafter determine. A.

ODORIFEROUS SUBSTANCES OFFENSIVE TO INSECTS.

From the New York Farmer.

It is said that common mint strewed among grain as it is mowed away in the barn will preserve it from being injured by vermin. Camphor, when kept among bed clothes, will keep away bed bugs and fleas. From these circumstances, together with the fact that we do not recollect of having seen plants strongly odoriferous injured by insects, we are led to conclude that farmers might be benefited by turning their attention to the subject.

INSECTS INJURIOUS TO FRUITS, AND FRUIT TREES.

From the American Farmer.

Mr. Editor.—In your paper of the 18th inst. you inserted, from the Richmond Enquirer, an article headed "Fine Fruit;" near the end of which, the writer, alluding to the worm which destroys the peach tree by cutting it near the root, says; "It is generally believed that if hogs are suffered to run at large in the orchard, or if the trees in the garden or yard are paved round, the curculio (the insect which produces the worm) will be arrested in its ravages." It is something new (to *me*, at least,) that the curculio and "*the insect which produces the worm*" in question, are one and the same thing. I had always been taught to believe differently, and do still think I am in the right. The curculio is certainly the insect which attacks the *smooth skinned* stone fruit as well as the apple and pear, by depositing in the young fruit an egg, which becomes a worm, and most frequently causes the fruit to fall off before maturity. Its greatest ravages are on the plum, apricot, and nectarine. The peach does not suffer so much, being defended by the down on the skin. When the fruit falls, the worm makes its way into the earth, where it undergoes its various changes, and the following year it comes forth a small winged insect of the beetle kind, which ascends the trees and begins to deposit its eggs in the fruit. Hogs are of service by devouring the fruit and insect before the latter has time to secrete itself in the earth. It is also useful to pave the yard or garden around the trees; because then the insect cannot penetrate into the earth, and perishes for want of its natural asylum, besides being liable to destruction from a thousand accidents. But the worm which eats into the root and lower part of the stem of peach trees, is a very different affair. If you turn to Kenrick's New American Orchardist, p. 238, you will find the following account of it, and several modes of preventing its attacks.

"The worm is produced by a fly which, from the middle of June to the first of August, deposits its eggs on the bark of the tree, generally at its root, where the bark is tender. These are soon hatched, and the worm shortly penetrates beneath the bark, where it commences its work of destruction, devouring the sap wood often around the whole circumference of the tree, causing the gum to exude, and often death.

"Much has been written and said of this insect; yet the prevention is very easy, provided there is a necessity for it, which is not the case in all soils and situations. It seems with us only an occasional evil, and the remedies are seldom required. Whenever serious suspicions arise, let every tree be carefully searched at the surface of the earth, and the worm destroyed by probing with a penknife or pointed wire. About the beginning of June, form around the trunk of the tree a small conical mound, to the height of eight inches or a foot above the natural surface of the earth. Unleached ashes, which might be preserved for this purpose are without doubt the best and most useful substance, and each tree will require about a peck. But any thing else, even soil, is found to answer. The design of this is to protect that portion of the tree where the bark is most tender; let this mound be levelled in October, and the bark will harden again beneath were it was placed. I am inclined to believe the potash wash before described would answer any purpose, as it does with the apple tree, if applied at the suitable time; also the wash recommended by Mr. Lindley. The *Garden Compound*, sold by Messrs. Russell of Boston, and Ives of Salem, I am persuaded would be effectual. Also *coal tar*. A gentleman of Nantucket is trying the coal tar with his peach trees. He is also trying it on the plank of his ships which sail to the Pacific to preserve them from the attacks of the sea worm; the odor it exhales is powerful and lasting.

"Another cheap, easy and effectual mode is practised by Mr. Vose of Dorchester. About the last of May, the soil is removed to the depth of two inches round the trunk; a composition of clay, ashes, &c. is applied with a brush; and over this stiff brown paper is wrapped around the tree to the height of a foot, and the earth replaced. Mr. Ellis, of New Jersey, has found that rye straw bound round the trunk from the surface upwards is effectual; and Mr. Wilson, of New York, in his *Economy of the Kitchen Garden*, has recommended grafting clay to be applied round the

trunk. Lime mortar mixed with sulphur is found good."

Now, Mr. Editor, if these few disjointed remarks be thought of any utility, they are at your service. But I would beg leave, at all events, to suggest the propriety of correcting a statement which might puzzle some inexperienced hand, and give him an erroneous idea of these insects, which agree, I believe, only in one particular, that, viz. of doing all possible injury to our fruit trees.

I am, sir, with great respect,

Your obd't. serv't.

M. A.

CHEESE MAKING.

From the New York Farmer.

This article is submitted as a demonstration of what can be effected in our country, by community of exertion and enterprise, directed to one staple commodity; and also what extraordinary impulse has been given in a few years to one department of agriculture, in a small section, by the facilities of transportation on the Erie Canal. Heavy produce is transported from Utica to New York for 25 cents per 100 lbs. on large contracts, this season.

Much public and general inquiry has of late been excited, by the rapid increase, extension, and improvement in cheese-making, in a district of about twenty miles in length, and ten or twelve in breadth, chiefly within, and parts of the towns of Salisbury, Norway, Fairfield, Newport, Russia and Trenton—and of butter-making in the town of Steuben; being the second tier or range of towns on the north side of Mohock river, and within the counties of Herkimer and Oneida. A sparse population was spread over all these towns as early as the year 1800, and in 1815 had become a well-settled country, emigrating to the west; and at that period, and even till the completion of the Erie canal, cheese, as an article of commerce, over and above the home consumption, was an item little thought of or known.

It is supposed that less than 60 tons were annually exported from this district at that period, and this was chiefly confined in its manufacture to a few families in Norway. This district is hilly, well watered, and better adapted to grazing than to any other department of agriculture; and without recourse to records, it is supposed that it may have doubled its population since 1815; and it is now ascertained that in 1832, though an unfavorable season for making, there was exported, the manufacture of this district, more than one thousand tons of cheese, besides twenty-five tons of pine-apple cheese. Mr. H. Burrell, of Salisbury, sold in New York market near 400 tons of the same. In the art of cheese-making, *improvement* has advanced in this district far towards what, in *this* age, is known of perfection, as will be acknowledged or attested by the extensive cheese merchants in New York, Philadelphia, and the cities south.

Steuben, early settled by that noted Baron, is much inhabited by emigrants from Wales, and their descendants; has long been almost exclusively devoted to butter-making; and, although a small town, sent, in 1832, one hundred and fifty tons of butter to New York market—which, as an article to keep good in tubs and firkins, stands high in market. Indeed, some small sections of the said cheese district make butter only.

The writer of this article was bred a farmer, and from the year 1806 to 1813 made a cheese dairy on the farm whereon he now lives, from 20 and some years from 30 cows. Cheese was then a dull article, and he relinquished that business; and again, in 1828, commenced on a cheese dairy of 40 cows, and now has, on the same farm, 80 cows. Inquiries are often made as to theory, and statistical facts pertaining to this subject, from friends and acquaintances, both near and remote, and he has been requested to communicate in writing the modern process of making, as practised by himself and many others, at this day, and also to point out as distinctly as might be, the difference between the former and the latter process. This has been done, by saying that less heat, and some less salt, is applied in the making, and the cheese made softer, and is kept from spreading and cracking, by swathing, soon after the cheese comes from the press. The milk, in warm weather, is not considerably below the warmth of milk directly from the cow. The rennet must be free of taint, and made in such quantity as to last several weeks, that its power can be relied upon to "fetch the cheese," in three quarters of an hour, or be sure in an hour, so as to "break up," which is done with the hands, from bottom to top of the tub or vat, or with a utensil made of fine brass wire, with a sharp iron or brass rim, in squares of three quarters of an inch, like a sieve, with two high bales crossing each other on the top, and reaching above the top of the tub; when broken up, it is then left for a little time, till the curd settles, and the whey rises on the top; then begin to draw or dip off, and of the first put some over the fire, and with it, as soon as may be, gradually increase the warmth in the tub, working off the whey and making fine the curd, endeavoring always so to manage that the whey is as green as possible. It is a conceded fact, that the greener the whey the richer the cheese. If the weather be hot, and there be any appearance of souring in the tub, the process must be hurried. and less heat applied, or the cheese will be hard and dry, and the yield small in proportion. For the last half hour, we have, in warm weather, about milk or animal heat in the tub or vat, and this is called the scalding process, which, if all works well, is done in about two hours from the setting, and ready to dip off into the cheese basket or cinque. It has, I believe, been a general practice to cool off the curd while in the tub, with cool whey or water, or the cheese will be rank, but we do not so; we let the cheese go to the press with its warmth, except what is imparted by making it fine and stirring in the salt, and think it closes better, and needs much less scalding, and is not so liable to be porous and spongy. We put two pounds of dry Onondaga salt to 100 lbs. of curd, pressed and worked so fine and dry that not more than two quarts of whey can be extracted by the press. We choose to have our cheese made so soft as to need swathing the first or second day; and if the weather be very hot, very soon after they come from the press. This is done with cheap cotton cloth, stained with annotto, and dipped in melted lard, and, by some cased entirely over, there to remain till the cheese goes to mar-

ket; it is then safe from flies to keep any length of time, if made so as not to leak.

The soft cheese ripens and matures much sooner than the dry hard cheese; the latter will dry much sooner; but maturing and drying are, or may be, very different. Cheese will shrink two to one in October that it will in August, yet it will ripen and mature three to one in August that it will in October and November.

Many suppose that large cheeses require more time to ripen than small ones, but we think not; the ripening process is of a chemical nature, rather accelerated by increased mass than retarded; as is also the mass of the baker, the brewer, and the distiller, by increased mass.

A very little cheese, made to please a child, will soon become dry, but never have maturity or taste. The coloring, if any, should be of annotto, dissolved in pure strong ley, a spoonful or two of which is sufficient for the milk of a large cheese; let the outside be painted with the same soon after the cheese comes from the press, then dry an hour, and be anointed with lard or butter. We do not darken the room, or attempt to keep out the flies, but depend on the soundness of the cheese to save it from their depredations. In hot weather we open our doors and windows, and give air; but cool dry winds, blowing directly on, will crack the cheese. In spring and fall we keep up a generous warmth; and indeed, in the cool damp days in midsummer, have fire in the cheese room stove, and so greatly accelerate the maturing process.

My sons commenced cheese-making the present year the 15th of April, and before August had three tons of cheese in market, which would have passed well with many for old cheese, being so ripened. It is found, by actual experiment, that every pound of butter taken from a cheese will shrink the weight of the same about three pounds for one. The experiment of making cheese of milk directly from the cow night and morning has been tried often in this section, but I know of no one who continues the practice. The yield will be greater, but the cheese rank, carrying into it something of that kind of taste peculiar to milk directly from the cow.

The reservoir for the whey, and every other thing that may have tendency to charge the atmosphere with impurity, should be kept at a sufficient distance; and the room where the milk stands over night, well ventilated.

The question is often asked, how much cheese will each fair dairy cow make in a season? and how much in a day will each such cow make at full grass in May? I answer, 300 lbs. is perhaps about an average yield for a fair dairy well kept; but a very choice selection of cows well kept will sometimes exceed 400 lbs. in a season, and one such cow may make four or five pounds in a day at full grass. We have very few cows of the improved breeds, and very little stock is raised. Many hundreds of cows are brought in annually from a distance, for sale and use.

EPHRAIM PERKINS,
One of the Com. of the New York State Agricultural Society for Oneida Co.
South Trenton, August, 1833.

"Living within the above cheese district, I am well convinced that the calculations here made by Ephraim Perkins, Esq. as to the quantity of cheese manufactured in second district, is to be relied on as correct; and his process of making worthy of the attention of those engaged in the dairy business.

W. WILLOUGHBY, M. D.
Late President of the Agricultural Society of Herkimer County.

BAYBERRY, OR MYRTLE WAX.

From the New England Farmer.

The vegetable wax, called bayberry in the northern, and myrtle wax in the southern parts of the United States, is the produce of a shrub called by botanists *Myrica Cerifera*, which sometimes grows to the size of a small tree, and is found abundantly along the coast, from Maine in the North, to Texas, on the Gulf of Mexico. The wax is extracted from this shrub by collecting the berries, boiling them with water, and bruising them at the same time, by which the wax will rise to the top as a thick oily scum, easily separated, which, when cold, turns out a moderately hard substance, of a green dingy color. After chemical investigation, that substance has been found to resemble bees' wax so closely in the most important properties, that they may be classed under the same genus of chemical bodies.

Until now, the use of this wax has been very limited, the farmers pick up in swamps and the woods a sufficient quantity to supply themselves with candles; and if there is any surplus, they send it to market in New York, Boston, or other northern places, where it is bought by candle makers, who mix it with their tallow, in order to correct in summer the extreme softness of their candles.

Notwithstanding the abundance of its growth, the picking up of the berries among swamps, thick wood and mire, is so laborious, that people who have attempted the collection of the wax as a special business and matter of trade, have found that one single bushel of berries is the utmost a stout and active man can collect in one day's work; hence its price in market is very high, fluctuating between 18 and 25 cents per pound.

The object of this publication is to invite the attention of farmers to the cultivation of the shrub affording the myrtle wax, in order to bring its price down to that of tallow. It is obvious that should the shrubs be collected in one field, consequently ready at hand—it is obvious, I say, that the same man, who under the difficulty of wandering in swamps, wood and mire, can collect but one bushel, shall be able, when he finds the shrubs gathered together in the same field, to pick up in the same space of time, from three to four bushels, can also deliver his wax at a price proportionably reduced; that is to say, from 25, to 8, 9, or 10 cents per pound.

The question now is, to investigate what will be the net produce of an acre planted in myrtle wax, the wax selling at the reduced price of 10 cents per pound.

Let us suppose each shrub planted at two and a half feet from each other, there will be in one acre 6724 of them: supposing, next, the average product of each shrub to be only one pint of the berries—that the whole crop will amount to 6724 pints, making up 105 bushels. Now, experience has shown by those who follow the trade, that the quantity of wax obtained from a bushel of berries, averages from 5 to 8 pounds; then our 105 bush-

els of berries would yield 630 pounds of wax, which, at 10 cents a pound, tallow price, would make $63.

As we have stated already, one man will pick up in a field from 3 to 4 bushels in one day, it follows that the picking of the whole 105 bushels, will require the labor of a hand during a whole month; admitting $18 for the wages and finding—then $18 deducted from $63, the value of the crop as before stated, the balance, $45, will be the net profit accruing to the farmer.

Besides such a valuable income, this culture receives additional recommendations from the following circumstances:

1st. It grows in the worst soils, especially if damp and sandy.

2d. It requires no fences, as the cattle do not meddle with it.

3d. Once planted, it requires no attendance except in picking time.

4th. The picking may be performed by boys, girls, old men and old women, who else would be useless on the plantation.

5th. By a process discovered lately, the myrtle wax may be bleached to a degree of whiteness equal to that of bees' wax. This process adds only five cents per pound to the original price, is done in a short time, and within the power of every individual to perform.

6th. A soap equal, if not superior, to any shaving or fancy soap imported from Europe, can be manufactured of the myrtle wax.

RESULT OF EXPERIMENTS ON WHEAT.

From the Genesee Farmer.

Mr. Editor,—Having observed much controversy maintained through the columns of the Genesee Farmer during the past year, upon the novel subject of wheat, by a natural process, turning to chess [cheat,] although from first to last incredulous, I had the curiosity to give the subject some attention; this more especially when the names of David Thomas and Gideon Ramsdell were to be seen among the belligerents. I claim the latter of these gentlemen as a former acquaintance and friend, and believe him a person of truth and rectitude, and that he would not on any account knowingly state that which he knew not to be true; but I am certainly disposed to think him laboring under a mistake when he asserts "wheat will turn to chess" under any circumstances.

The subject being both new and interesting to me, I embraced the earliest opportunity of testing its truth by experiment. Accordingly I removed a piece of sward from a waste corner in my garden—marked the spot and took every precaution against deception. Thirty small stakes were then driven down in this prepared spot; and from the outside of a wheat stack I took a head of wheat, the grains of which appeared considerably weather-beaten and of a dull color, some of the grains were sprouted and the sprouts withered. I placed a grain of this wheat by the side of each stake and left them uncovered, protecting it from the fowl with brush. When it came up in the fall I examined it critically, and ascertained that each stalk came directly from the grains of wheat I had planted. The severity of the winter killed a part of it. That which withstood the winter I kept clear of weeds and grass. Early in May I mutilated one half of it—it sprung up again and all produced *wheat*, and not so much as one grain of chess. Not being satisfied with the first, I made a second experiment; trying to raise chess on a larger scale. In thrashing my wheat on an earthern floor exposed to the weather, a shower came up and prevented me from sweeping the floor after the chief of the wheat was removed where it could be kept dry; the sweepings lay on the floor two weeks, until it had the appearance of being much damaged, it was then taken up without further cleaning and sowed in a place adjoining the place sowed with the wheat which was thrashed and properly taken care of at the same time. At harvest time I could discover no more chess upon that part sowed with the damaged wheat, than upon that sowed with the good wheat. There was as usual some through all of it.

* * * * *

SENECA LAPHAM.

Champaign Co. Ohio, Oct. 1, 1833.

FALL OF A CLIFF IN ENGLAND.

From White's Natural History of Selborne.

When I was a boy, I use to read with astonishment and implicit assent, accounts in Baker's Chronicle of walking hills and travelling mountains. John Philips, in his Cyder, alludes to the credit that was given to such stories with a delicate but quaint vein of humor peculiar to the author of the Splendid Shilling.

"I nor advise, nor reprehend, the choice
Of Marcley Hill; the apple no where finds
A kinder mould: yet 'tis unsafe to trust
Deceitful ground: who knows but that, once more,
This mount may journey, and, his present site
Forsaking, to thy neighbor's bounds transfer
Thy goodly plants, affording matter strange
For law debates!"

But when I came to consider better, I began to suspect that though our hills may never have journeyed far, yet that the ends of many of them have slipped and fallen away at distant periods, leaving the cliffs bare and abrupt. This seems to have been the case with Nore and Whetham Hills, and especially with the ridge between Harteley Park and Ward-le-ham, where the ground has slid into vast swellings and furrows, and lies still in such romantic confusion as cannot be accounted for from any other cause. A strange event, that happened not long since, justifies our suspicions; which though it befell not within the limits of this parish, yet as it was within the hundred of Selborne, and as the circumstances were singular, may fairly claim a place in a work of this nature.

The months of January and February, in the year 1774, were remarkable for great melting snows and vast gluts of rain, so that by the end of the latter month the land-springs, or levants, began to prevail, and to be near as high as in the memorable winter of 1764. The beginning of March also went on in the same tenor, when in the night between the 8th and 9th of that month, a considerable part of the great woody hanger at Hawkley was torn from its place, and fell down, leaving a high free-stone cliff naked and bare, and resembling the steep side of a chalk pit. It appears that this huge fragment, being perhaps sapped and undermined by waters, foundered, and was ingulfed, going down in a perpendicular direction; for a

gate, which stood in the field on the top of the hill, after sinking with its posts for thirty or forty feet, remained in so true and upright a position as to open and shut with great exactness, just as in its first situation. Several oaks also are still standing, and in a state of vegetation, after taking the same desperate leap.

That great part of this prodigious mass was absorbed in some gulf below, is plain also from the inclining ground at the bottom of the hill, which is free and unincumbered, but would have been buried in heaps of rubbish, had the fragment parted and fallen forward. About a hundred yards from the foot of this hanging coppice stood a cottage by the side of a lane; and two hundred yards lower, on the other side of the lane, was a farm house, in which lived a laborer and his family; and just by, a stout new barn. The cottage was inhabited by an old woman and her son and his wife. These people, in the evening, which was very dark and tempestuous, observed that the brick floors of their kitchen began to heave and part, and that the walls seemed to open, and the roofs to crack; but they all agree that no tremor of the ground, indicating an earthquake, was ever felt, only that the wind continued to make a most tremendous roaring in the woods and hangers. The miserable inhabitants, not daring to go to bed, remained in the utmost solicitude and confusion, expecting every moment to be buried under the ruins of their shattered edifices. When daylight came, they were at leisure to contemplate the devastations of the night. They then found that a deep rift, or chasm, had opened under their houses, and torn them, as it were, in two, and that one end of the barn had suffered in a similar manner; that a pond near the cottage had undergone a strange reverse, becoming deep at the shallow end, and so *vice versa;* that many large oaks were removed out of their perpendicular, some thrown down, and some fallen into the heads of neighboring trees; and that a gate was thrust forward, with its hedge, full six feet, so as to require a new track to be made to it. From the foot of the cliff, the general course of the ground, which is pasture, inclines in a moderate descent for half a mile, and is interspersed with some hillocks, which were rifted, in every direction, as well towards the great woody hanger as from it. In the first pasture the deep clefts began, and, running across the lane and under the buildings, made such vast shelves that the road was impassable for some time; and so over to an arable field on the other side, which was strangely torn and disordered. The second pasture field, being more soft and springy, was protruded forward without many fissures in the turf, which was raised in long ridges resembling graves, lying at right angles to the motion. At the bottom of this enclosure the soil and turf rose many feet against the bodies of some oaks that obstructed their farther course, and terminated this awful commotion.

The perpendicular height of the precipice, in general, is twenty-three yards; the length of the lapse or slip, as seen from the fields below, one hundred and eighty-one; and a partial fall, concealed in the coppice, extends seventy yards more; so that the total length of this fragment that fell was two hundred and fifty-one yards. About fifty acres of land suffered from this violent convulsion; two houses were entirely destroyed; one end of a new barn was left in ruins, the walls being cracked through the very stones that composed them; a hanging coppice was changed to a naked rock: and some grass grounds and an arable field so broken and rifted by the chasms, as to be rendered, for a time, neither fit for the plough nor safe for pasturage, till considerable labor and expense had been bestowed in levelling the surface and filling in the gaping fissures.

EXTRACTS FROM WHITE'S NATURAL HISTORY OF SELBORNE.

Tame Bat.

I was much entertained last summer with a tame bat, which would take flies out of a person's hand. If you gave it any thing to eat, it brought its wings round before the mouth, hovering and hiding its head in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of the flies, which were always rejected, was worthy of observation, and pleased me much. Insects seemed to be most acceptable, though it did not refuse raw flesh when offered; so that the notion, that bats go down chimneys and gnaw men's bacon, seems no improbable story. While I amused myself with this wonderful quadruped, I saw it several times confute the vulgar opinion that bats, when down on a flat surface, cannot get on the wing again, by rising with great ease from the floor. It ran, I observed, with more despatch than I was aware of; but in a most ridiculous and grotesque manner.

Bats drink on the wing, like swallows, by sipping the surface as they play over pools and streams. They love to frequent waters, not only for the sake of drinking, but on account of insects, which are found over them in the greatest plenty. As I was going some years ago, pretty late in a boat, from Richmond to Sunbury, on a warm summer's evening, I think I saw myriads of bats between the two places; the air swarmed with them all along the Thames, so that hundreds were in sight at a time.

Harvest Mouse.

I have procured some of the mice mentioned in my former letters,—a young one, and a female with young, both of which I have preserved in brandy. From the color, shape, size, and manner of nesting, I make no doubt but that the species is nondescript. They are much smaller, and more slender, than the *mus domesticus medius* of Ray, and have more of the squirrel or dormouse color. Their belly is white; a straight line along their sides divides the shades of their back and belly. They never enter into houses; are carried into ricks and barns with the sheaves; abound in harvest; and build their nests amidst the straws of the corn above the ground, and sometimes in thistles. They breed as many as eight at a litter, in a litter round nest composed of the blades of grass or wheat.

One of these nests I procured this autumn, most artificially platted, and composed of the blades of wheat; perfectly round, and about the size of a cricket-ball; with the aperture so ingeniously closed, that there was no discovering to what part it belonged. It was so compact and well filled, that it would roll across the table without being discomposed, though it contained eight little mice that were naked and blind. As this nest was perfectly full, how could the dam come at her litter respec-

tively, so as to administer a teat to each? Perhaps she opens different places for that purpose, adjusting them again when the business is over; but she could not possibly be contained herself in the ball with her young, which, moreover, would be daily increasing in bulk. This wonderful procreant cradle, an elegant instance of the efforts of instinct, was found in a wheat field suspended in the head of a thistle.

As to the small mice, I have farther to remark, that though they hang their nests for breeding up amidst the straws of the standing corn, above the ground, yet I find that, in the winter, they burrow deep in the earth, and make warm beds of grass; but their grand rendezvous seems to be in corn ricks, into which they are carried at harvest. A neighbor housed an oat rick lately, under the thatch of which were assembled near a hundred, most of which were taken, and some I saw. I measured them, and found that, from nose to tail, they were just two inches and a quarter, and their tails just two inches long. Two of them, in a scale, weighed down just one copper half-penny, which is about the third of an ounce avoirdupois; so that I suppose they are the smallest quadrupeds in this island. A full grown *mus medius domesticus* weighs, I find, one ounce, lumping weight, which is more than six times as much as the mouse above, and measures from nose to rump four inches and a quarter, and the same in its tail.*

The Viper.

Providence has been so indulgent to us as to allow of but one venomous reptile of the serpent kind in these kingdoms, and that is the viper. As you propose the good of mankind to be an object of your publications, you will not omit to mention common salad oil as a sovereign remedy against the bite of the viper. As to the blind worm (*anguis fragilis*, so called because it snaps in sunder with a small blow,) I have found, on examination, that it is perfectly innocuous.†

Noxious Insects.

A full history of noxious insects, hurtful in the field, garden and house, suggesting all the known and likely means of destroying them, would be allowed by the public to be a most useful and important work. What knowledge there is of this sort lies scattered, and wants to be collected; great improvement would soon follow of course. A knowledge of the properties, economy, propagation, and in short, of the life and conversation of these animals, is a necessary step to lead us to some method of preventing their depredations.

As far as I am a judge, nothing would recommend entomology more than some neat plates that should well express the generic distinction of insects according to Linnæus; for I am well assured, that many people would study insects, could they set out with a more adequate notion of those distinctions than can be conveyed at first by words alone.

* This must be a different and larger animal than the domestic mouse of Virginia; one which seemed to be fully grown, and of common size, measured 3 inches from nose to tail, and 3⅛ of tail—weighed 9 dwts. 21 grains.

† Is the *blind-worm* the *jointed-snake* of Virginia?

Fern-Owl.

On the 12th of July, I had a fair opportunity of contemplating the motions of the *caprimulgus*,* or fern-owl, as it was playing round a large oak that swarmed with *scarabæi solstitiales*, or fern-chafers.

Note.—We find the following additional information regarding the goat-sucker, in Mr. White's Miscellaneous Observations:—"The country people have a notion that the fern-owl, or churn-owl, or eve-jar, which they also call a puckeridge, is very injurious to weaning calves, by inflicting, as it strikes at them, a fatal distemper, known to cow-leeches by the name puckeridge. Thus does this harmless, ill-fated bird, fall under a double imputation, which it by no means deserves—in Italy, of sucking the teats of goats, whence it is called *caprimulgus;* and with us, of communicating a deadly disorder to cattle. The least observation and attention would convince men, that these birds neither injure the goat-herd nor the grazier, but are perfectly harmless, and subsist alone, being night birds, on night insects, such as *scarabæi* and *phalænæ*, and through the month of July on *scarabæus solstitialis*, which in many districts abounds at that season. Those that we have opened have always had their craws stuffed with large night moths and their eggs, and pieces of chafers; nor does it any wise appear, how they can, weak and unarmed as they seem, inflict any harm upon kine, unless they possess the powers of animal magnetism, and can affect them by fluttering over them. A fern-owl, this evening, (August 27,) showed off in a very unusual and entertaining manner, by hawking round the circumference of my great spreading oak, for twenty times following, keeping mostly close to the grass, but occasionally glancing up amongst the boughs of the tree. This amusing bird was then in pursuit of a brood of some particular *phalæna* belonging to the oak, and exhibited on the occasion a command of wing superior, I think, to the swallow itself.

When a person approaches the haunts of fern-owls in an evening, they continue flying round the head of the obtruder, and by striking their wings together above their backs, in the manner that pigeons, called twisters, are known to do, make a smart snap.† Perhaps at that time they are jealous for their young, and their noise and gesture are intended by way of menace. Fern-owls have attachment to oaks no doubt on account of food; for the next evening we saw one again several times among the boughs of the same tree; but it did not skim round its stem over the grass, as on the evening before. In May, these birds find the *scarabæus melalontha* on the oak, and the *scarabæus solstitialis* of midsummer. These peculiar birds can only be watched and observed for two hours in the twenty-four, and then in a dubious twilight, an hour after sunset and an hour before sunrise.

The powers of its wings were wonderful, exceeding, if possible, the various evolutions, and quick turns of the swallow genus. But the circumstance that pleased me most was, that I saw it distinctly more than once put out its short leg while on the wing, and, by a bend of the head, deliver somewhat into its mouth. If it takes any part of its prey with its foot, as I have now the

[* Night-Hawk—vulgarly, the large bat.]

† I believe this is also done by the bill, in the manner of owls when disturbed.—W. J.

greatest reason to suppose it does these chafers, I no longer wonder at the use of its middle toe, which is curiously furnished with a serrated claw.

House Martins.

A few house martins begin to appear about the 16th of April; usually some few days later than the swallow. For some time after they appear, the *hirundines* in general pay no attention to the business of nidification, but play and sport about, either to recruit from the fatigue of their journey, if they do migrate at all, or else that their blood may recover its true tone and texture after it has been so long benumed by the severities of winter.

About the middle of May, if the weather be fine, the martin begins to think in earnest of providing a mansion for its family. The crust or shell of this nest seems to be formed of such dirt or loam as comes most readily to hand, and is tempered and wrought together with little bits of broken straws to render it tough and tenacious. As this bird often builds against a perpendicular wall without any projecting ledge under, it requires its utmost efforts to get the first foundation firmly fixed, so that it may safely carry the superstructure. On this occasion the bird not only clings with its claws, but partly supports itself by strongly inclining its tail against the wall, making that a fulcrum; and thus steadied, it works and plasters the materials into the face of the brick or stone. But then, that this work may not, while it is soft and green, pull itself down by its own weight, the provident architect has prudence and forbearance enough not to advance the work too fast; but by building only in the morning, and by dedicating the rest of the day to food and amusement, gives it sufficient time to dry and harden. About half an inch seems to be a sufficient layer for a day. Thus careful workmen when they build mud walls (informed at first perhaps by this little bird) raise but a moderate layer at a time, and then desist; lest the work should become top-heavy, and so be ruined by its own weight. By this method, in about ten or twelve days, is formed an hemispheric nest, with a small aperture towards the top, strong, compact and warm; and perfectly fitted for all the purposes for which it was intended. But then nothing is more common than for the house sparrow, as soon as the shell is finished, to seize on it as its own, to eject the owner, and to line it after its own manner.

After so much labor is bestowed in erecting a mansion, as nature seldom works in vain, martins will breed on for several years together in the same nest, where it happens to be well sheltered and secure from the injuries of weather. The shell or crust of the nest is a sort of rustic work, full of knobs and protuberances on the outside; nor is the inside of those that I have examined smoothed with any exactness at all; but is rendered soft and warm, and fit for incubation, by a lining of small straws, grasses, and feathers; and sometimes by a bed of moss interwoven with wool. In this nest they tread, or engender, frequently during the time of building; and the hen lays from three to five white eggs.

At first, when the young are hatched, and are in a naked and helpless condition, the parent birds, with tender assiduity, carry out what comes away from their young. Was it not for this affectionate cleanliness, the nestlings would soon be burnt up, and destroyed in so deep and hollow a nest, by their own caustic excrement. In the quadruped creation, the same neat precaution is made use of; particularly among dogs and cats, where the dams lick away what proceeds from their young. But in birds there seems to be a particular provision, that the dung of nestlings is enveloped in a tough kind of jelly, and therefore is the easier conveyed off without soiling or daubing. Yet, as nature is cleanly in all her ways, the young perform this office for themselves in a little time, by thrusting their tails out at the aperture of their nest. As the young of small birds presently arrive at their stature, or full growth, they soon become impatient of confinement, and sit all day with their heads out at the orifice, where the dams, by clinging to the nest, supply them with food from morning to night. For a time the young are fed on the wing by their parents; but the feat is done by so quick and almost imperceptible a slight, that a person must have attended very exactly to their motions, before he would be able to perceive it.

As soon as the young are able to shift for themselves, the dams immediately turn their thoughts to the business of a second brood; while the first flight, shaken off and rejected by their nurses, congregate in great flocks, and are the birds that are seen clustering and hovering, on sunny mornings and evenings, round towers and steeples, and on the roofs of churches and houses. These congregatings usually begin to take place about the first week in August; and therefore we may conclude that by that time the first flight is pretty well over. The young of this species do not quit their abodes all together; but the more forward birds get abroad some days before the rest. These, approaching the eaves of buildings, and playing about before them, make people think that several old ones attend one nest. They are often capricious in fixing on a nesting-place, beginning many edifices, and leaving them unfinished; but when once a nest is completed in a sheltered place, it serves for several seasons. Those which breed in a ready finished house, get the start, in hatching, of those that build new, by ten days or a fortnight.

These industrious artificers are at their labors in the long days before four in the morning: when they fix their materials they plaster them on with their chins, moving their heads with a quick vibratory motion. They dip and wash as they fly sometimes in very hot weather, but not so frequently as swallows. It has been observed that martins usually build to a north-east or north-west aspect, that the heat of the sun may not crack and destroy their nests: but instances are also remembered where they bred for many years in vast abundance in a hot stifled inn-yard, against a wall facing to the sun.

Birds in general are wise in their choice of situation; but in this neighborhood, every summer, is seen a stong proof to the contrary at a house without eaves, in an exposed district, where some martins build year by year in the corners of the windows. But, as the corners of these windows (which face to the south-east and south-west,) are too shallow, the nests are washed down every hard rain; and yet these birds drudge on to no purpose from summer to summer, without changing their aspect or house. It is a piteous sight to see them laboring when half their nest is washed away, and bringing dirt "*generis lapsi sarcire ruinas.*" Thus is instinct a most wonderfully unequal faculty; in

some instances so much above reason; in other respects, so far below it! Martins love to frequent towns, especially if there are great lakes and rivers at hand; nay, they even affect the close air of London. And I have not only seen them nesting in the borough, but even in the Strand and Fleet street; but then it was obvious, from the dinginess of their aspect, that their feathers partook of the filth of that sooty atmosphere. Martins are by far the least agile of the four species; their wings and tails are short, and therefore they are not capable of such surprising turns, and quick and glancing evolutions, as the swallow. Accordingly, they make use of a placid, easy motion in a middle region of the air, seldom mounting to any great height, and never sweeping along together over the surface of the ground or water. They do not wander far for food, but affect sheltered districts, over some lake, or under some hanging wood, or in some hollow vale, especially in windy weather. They breed the latest of all the swallow kind: in 1772, they had nestlings on to October the 21st, and are never without unfledged young as late as Michaelmas.

As the summer declines, the congregating flocks increase in numbers daily by the constant succession of the second broods: till at last they swarm in myriads upon myriads round the villages on the Thames, darkening the face of the sky as they frequent the aits of that river, where they roost. They retire, the bulk of them I mean, in vast flocks together, about the beginning of October; but have appeared, of late years, in a considerable flight in this neighborhood, for one day or two, as late as November the 3d and 6th, after they were supposed to have gone for more than a fortnight. They, therefore, withdraw with us the latest of any species. Unless these birds are very short-lived, indeed, or unless they do not return to the district where they are bred, they must undergo vast devastations somehow, and somewhere; for the birds that return yearly bear no manner of proportion to the birds that retire.

House martins are distinguished from their congeners by having their legs covered with soft downy feathers down to their toes. They are no songsters, but twitter in a pretty, inward, soft manner in their nests. During the time of breeding, they are often greatly molested with fleas.

MARL DISCOVERED IN THE GRANITE AND COAL REGION OF VIRGINIA.

To the Editor of the Farmers' Register.

Amelia, Nov. 12, 1833.

DEAR SIR—Your publications on calcareous manures have awakened much interest in our country, especially in eastern Virginia; in the tide-water district of which, beds of marine shells are numerous, and are at once recognized as the material called marl in this country. But calcareous substances may, and certainly do exist in our country in other shapes than common limestone, shells, marble, or gypsum, all of which are strictly calcareous.

According to Buffon's theory, these masses are marine remains transmuted by the slow and silent operations of nature. This view is sustained by many interesting facts; whilst we must consider Darwin's "*Omnia e Concha*" rather extravagant. However, the curious and sceptical will be disposed to concur with Buffon on examining the bluffs at the Blowing Cave, Calaghan's, and the Salt Sulphur Springs. I have at hand several specimens from the two first named places, bearing the marks of shells as plainly as wax bears the impress of a seal. But to return to the subject.

As lime in its various combinations and conditions is known to be a valuable ingredient in the earthy constitution of the soil, independent of its use in managing other manures, and as a cement, it is desirable that we should be acquainted with its various appearances and localities, as the value of land is at once enhanced wherever it is discovered. The price now demanded for the location of that presently to be described, is advanced a third on what was formerly asked, though not one pound has been yet applied to the land as manure.

You will herewith receive a just and beautiful specimen of a calcareous mass, which, if you deem worthy, please to analyze and describe.

The credit of the discovery is due to our worthy neighbor Major John H. Steger of this county, who has in occupancy an estate called Bear Island, lying between the first branches of Pamunky river in Hanover county, where this article was found—which, for want of a better name, I will call rock marl.

This gentleman having observed great improvement from the use of marl on South-Wales, the second estate below, determined to examine his premises for that article. Several persons made an imperfect search, and no shells were discovered; but a shark's tooth, lying on, or in a soft rock, was found, which attracted attention. Common vinegar was poured on a portion of the rock without its throwing up any fixed air; but on the application of muriatic acid it effervesced actively, showing that it was certainly a *carbonate;* and from the presence of the shark's tooth, that it was probably calcareous. Subsequent but imperfect analysis confirms the impression.

Bear Island is situated on the first bed, and within a short distance of the first cropping of granite in ascending the Pamunky, and is pretty clearly in the same geological range that the Chesterfield and Henrico coal mines are, being in a north-eastwardly course from them, and showing thin strata of coal in a bluff of free-stone which overlooks Little river, a tributary of Pamunky, and the northern boundary of the tract. The calcareous mass, as exposed by a small rill passing over and through it, is about three feet thick and thirty or forty long; the spade and hoe will probably discover a much larger body. It is about fifteen or twenty feet below the general surface of the adjacent table land, and about forty or fifty above the bed of the neighboring river, between which and the hill side where this mass is bedded, there is a strip of flat land. The color is that of ashes, with waving lines of lighter and darker shades running in some places into confused curls or convolutions: its consistency is that of soapstone, the firmest chalk, or the fossil clam shells; but in no place is the color or shape of a shell to be found. Indeed, so singular is its location and appearance for marl or calcareous substances, so far as I am acquainted with them, that I observed to Major S. had he been acquainted with marl, he would not have made the discovery: to this he facetiously ap-

plied the familiar saying which implies that the greatest folly is attended by the best fortune—but this is in no wise applicable to him, especially in farming operations. Some useful hints may be gathered, and many curious speculations drawn from the above facts; but as paper and time are nearly exhausted, I leave them to abler hands, and will close with the expression of thanks for the pleasure received and the profit hoped to be derived from the spirited "Farmers' Register."

Respectfully, THOMAS MEAUX.

MAGNESIAN MARL.

The earth described in the foregoing letter deserves more than common attention, not only on account of its peculiar appearance, and its being found in a region before supposed destitute of calcareous earth, but also for its singular chemical constitution. To the eye, it does not seem to be even slightly calcareous—or at best to be an argillaceous marl, very poor in calcareous matter. But upon examination by proper tests, it was found to be richer in *earthy carbonates* than any whole body of marl yet known in Virginia. By the most common mode of analysis, (separating the clay and sand, and estimating the calcareous earth by subtracting the quantities found from the whole specimen,) and also by the most correct mode, with all marls before examined, (measuring the gas evolved,) the whole of the earthy carbonates would have passed for so much calcareous earth, and the marl would have been reported as containing 85 in the 100 parts of that ingredient. But this astonishing result, and the consequent importance of the discovery, induced varied and more extended experiments to be made, which served to prove that the earth contained a large proportion of *carbonate of magnesia*, in addition to as much *carbonate of lime*, as would alone constitute a rich manure. Whether the addition of the magnesia increases or lessens the value of the whole as manure, will not now be considered. It is, however, important that it should be known as constituting so large a proportion of this earth, especially as it will probably be found in many other places near the granite range. The effervescence of this marl, even when finely pounded and exposed to the action of strong acids, is remarkably slow for its strength—much slower than that of common marl of the poorest kind. This peculiarity first caused the suspicion to be formed that magnesia was present; and the same circumstance may serve to guide to the like result, in future discoveries of similar magnesian marls.

The first lump of this earth which was examined, was received from Mr. Steger, and analyzed, before Dr. Meaux's letter was brought with another sample. The chemical character of both was very nearly the same, but there was some difference in the appearance of the two. The first seemed to be composed of very thin *laminæ*, the lines between which were quite plain to the eye, but all still forming a perfectly solid mass. In the second mass no laminæ, nor lines were seen—but some scattered black particles, too small to be separated for trial, which looked like the specks of charcoal. When moist, the earth is of an ash color—when dry, a very light ash, or dirty white. The dry lumps seem to be about as hard as chalk, and break much in the same manner. When lumps are thrown into a glass of water and left undisturbed, some retain their form, but others crumble rapidly, and fall to what might be called powder, if that term could be properly applied to a substance covered by water. The small lumps which were not reduced, were mostly tinged on one side with color of rust of iron, which probably marks the exposed surface of the bank. It seems likely that, notwithstanding the hardness of the marl, it will be easily made fine enough by exposure to rain and freezing, when used as manure. The constituent parts will now be stated.

100 grains of the first sample, yielded a bulk of carbonic gas equal to 43 oz. measures of water, which would indicate 86 grains of *carbonate of lime* (or calcareous earth) to have been dissolved by the acid applied, if all the earthy carbonate had been of lime, and none of magnesia. The amount of both these earths was nearly that quantity (86 grains) but not exactly, as magnesia combines with proportions of carbonic acid different from lime.

16 grains of dark ash colored clay, without a particle of sand, was all the solid matter remaining.

Of the second specimen,

100 grains evolved 42½ measures of carbonic acid gas, indicating 85 grains of earthy carbonates, without allowing for the error above referred to, caused by part being magnesia.

The soluble parts were then separated from the solid, and the lime from the magnesia, by the process directed by Davy, and the proportions found to be as follows:

13	grains of dark clay apparently free from all silicious matter.
50	— — carbonate of lime,
13	— — carbonate of magnesia.
94	
6	loss.
100	

The loss was caused by some of the earth's being unavoidably left adhering to the several filtering papers, in which manner all the different parts were collected separately, and weighed after being scraped off.

Besides these different modes of examination, (one of which served to give the proportion of carbonic acid, and the other of each of the three earthy ingredients,) there were several other methods tried, more or less complete, but all of which tended to the same general results. Indeed, the want of proper apparatus, and of some of the most convenient tests, as well as the inexperience and unskilfulness of the operator, made it necessary to employ much time and trouble in repeated and varied experiments, which were thought due to the importance of the subject. But, however slowly and awkwardly the results may have been reached, they are not the less relied on as being correct—or enough so for every useful purpose. Among other variations of the mode of examination, one was to add slowly to the pulverized marl, *sulphuric acid*, grinding them well together (in a semi-fluid state,) in a glass vessel. After being thus well mixed, and remaining some hours, enough wa-

ter was added to enable the soluble parts to be separated by filtering. Of course, this brought off all the magnesia, in the form of Epsom salts, and with the clay left the lime, rendered insoluble (or nearly so) by being converted to gypsum. This showed clearly that magnesia was present, and in large quantity. It was precipitated from the filtered solution by adding *carbonate of potash*. In another trial, instead of being precipitated, it was exhibited as Epsom salts (in solution) of which the peculiar nauseous bitter taste sufficiently proved its kind, and of course the existence of the magnesia from which it is formed. This is not the best method of finding magnesia—but may be useful when better means cannot be used.

This statement has been made more in detail than necessary, if the discovery of this kind of marl is to end where it is, or if the benefit of a single landholder only was concerned. But it seems reasonable to believe that this kind of earth may be found to stretch over a large part of the granite region where this has been found—and it may be advantageous to many to have the clearest description of the appearance and chemical character of an earth, which promises so little to the eye.

Dr. Meaux writes that the farm on which the discovery has been made, has been thereby enhanced immediately one third in price. A much greater advance ought to be made, if this resource for fertilization is in sufficient abundance. If the magnesia is supposed to be worthless, and to do neither good nor harm as manure, the marl is still rich enough in calcareous earth to double at once the value of any farm on which it is discovered—and to quadruple it by being used. But though very little if any thing is known of the operation of carbonate of magnesia on soils, and nothing but actual experiment can determine it, still there is every reason to suppose it to act in a similar manner with calcareous earth, which it so nearly resembles in chemical qualities. And if the magnesia is equal in value to lime (both being carbonated or mild) which would make the strength of the manure 85-100, then it will be not only used where discovered, but may be profitably transported for manure to considerable distances.

There has been much controversy respecting the action of magnesia as manure—but its effects when caustic, as when calcined with quick-lime, were only considered and little or no attention paid to it in its carbonated, or mild form. But defective as they are in this respect, such opinions as have been expressed will now be interesting to many of our readers, and we shall extract them from some of the most intelligent writers on the subject. Though but little has been published as to the effects of carbonate of magnesia, (as presented in this magnesian marl,) the testimony and opinions expressed are in favor of its being valuable as manure. The discovery of this marl with such remarkable qualities, offers strong encouragement to others to search for such beds, and try their value themselves by chemical tests. A few drops of muriatic acid in this case served to disclose a concealed and invisible value, which will be worth thousands of dollars to the owner. Nor need such examination be limited to so incomplete a trial as first indicated that the earth was calcareous. Almost any person by attending to the directions which have been given in several different works (Davy's Agricultural Chemistry for one,) may soon learn to analyze marls with sufficient accuracy. This knowledge, and its practice, will be valuable to every person who is using calcareous manures; and the same value cannot be as well supplied by any degree of trouble imposed for that purpose on another and distant operator.

The discovery of this rich calcareous bed in the granite range, together with the great extent of the argillaceous marl discovered by Dr. Morton, and announced in the first number of the Farmers' Register, furnish good reasons for believing that every region of Virginia is provided by nature with sources from which to obtain calcareous manures in abundance. The consideration of the ultimate results to be expected, if this hope indeed is well founded, opens a prospective view of agricultural improvement and national benefit, which if exhibited, perhaps would not (at present) add to any reputation we may have for possessing soundness of judgment. We will therefore close these remarks, with repeating a suggestion which we have before made. If the legislature would employ some scientific and practical geologist, having a competent knowledge of agricultural chemistry, to survey the whole territory of Virginia, and report all discoveries of minerals, whether manures, metallic ores, or materials for manufactures, there can be little doubt but that the gain to the commonwealth would exceed the expense tenfold, If the discoveries made by Dr. Morton, and that which has produced these comments, had been due to such an agent employed by the government, their value alone would overpay the salary that would procure the scientific attainments and laborious services required for the faithful performance of such duties for a year.

EXTRACTS FROM SEVERAL AUTHORS, SHOWING THEIR OPINIONS OF THE EFFECTS OF MAGNESIA, IN DIFFERENT FORMS, ON SOILS.

I.

The question considered whether Magnesian Limestone is pernicious to vegetation!

From the [Edinburgh] Farmers' Magazine.

During two or three years past I seldom returned to this city, from my laborious peregrinations through the highlands and isles, without having my ears perpetually stunned with violent invectives against the use of lime, which contains magnesia, as manure. Some zealous friends of mine (whose zeal exceeds their knowledge) suggested the propriety of analyzing all the limestone quarries in their vicinage, and, if found to contain a particle of magnesia, proposed that they should be shut up by act of Parliament, and prevented from poisoning the crops in their neighborhood.

In fact, among your agriculturists, the *magnesiæ-phobia* seems to be the order of the day: and they appear to be as much terrified at magnesia, as a helpless traveller, like me, is sometimes at mad dogs.

My peregrinations having precluded me from perusing any of the original publications which excited this magnesiæ-phobia, I beg leave to offer a few remarks on an essay, signed TYRO, *Yorkshire*, 1804. Vol. v, p. 272.

As far as I can learn, the magnesiæ-phobia commenced in Yorkshire, and has spread by repeated

undulations through the island, and has topsy-turvied stronger brains than mine.

1. The first remark I beg leave to make on this gentleman's essay is, that he does not point out the state or combinations of the magnesia, which produce such dreadful effects. This question I have repeatedly put to several of my friends, who were visibly under the highest paroxysm of the magnesiæ-phobia; but, whether from ignorance, or from the disorder having reached their cranium, I never could draw from them any distinct answer. In one point only they all concurred, in expressing the greatest horror and alarm at magnesia coming within a hundred miles of their land; and some, when they learned that this deleterious substance was capable of combinations, became still more alarmed lest it might be smuggled in upon them in a form which they had no means of detecting.

2. Your correspondent, TYRO, not only omits specifying the state of the magnesia which proves so hurtful to land, viz. Whether it is pure carbonate, or with what acid it is combined, but also neglects to mention the mode by which the solution of the limestone is effected. All I am left to gather on this point is, that the solution was effected in a way similar to that, the fallacy of which I have already pointed out in a preceding essay.

Whatever way his solution was effected, I can only say, that his *ammonia*, or *vol-alkali*, would throw down several other matters before it touched magnesia; and that his whole scheme of analysis appears liable to objections. I might enter into particulars in order to establish this assertion; but, not wishing to embark in any controversies remote from practical utility, I shall content myself with showing that magnesia, under certain combinations, is either harmless or beneficial to the growth of plants.

3. It must appear strange to any man endowed with reason, that magnesia, which is evolved by the putrefaction and combustion of (I may venture to say) all animal and vegetable substances, should operate as a poison to plants. How does this substance get into plants? doubtless by their roots. How does it get into animals? doubtless by feeding on plants which contain it. How does it get into animals which do not feed on plants? doubtless by devouring animals which feed on plants. The uses of magnesia in the vegetable and animal economy are yet unknown; but that its uses are great, may be inferred from this fact, that it always exists in both kingdoms, and often in considerable proportion.

4. I had long ago ascertained that many strata of limestone in Scotland, but especially those alloyed with clay, contained various proportions of magnesia. In these cases I always found the magnesia to exist either in the state of carbonate, or combined with sulphur; and not unfrequently existing in both these states in the same rock. When combined with sulphur, it effloresces into sulphate of magnesia, which often forms a hoary incrustation on the face of the rock. Yet the farmers, who used the lime of these rocks in great quantities, never entertained the smallest apprehension that it was injurious to vegetation.

5. I have analysed various coal ashes, and never failed to find in them sulphate of magnesia, and sometimes also subcarbonate of magnesia, both, not unfrequently, in considerable proportions. Yet coal ashes are applied to certain soils with very good effect.

6. Lord Dundonald having stated, in his Essay on Manures, that peat-ashes contained pot-ash, to which he ascribed their virtues as manure, I was led to analyze peat-ashes in various places from Ayrshire to Caithness, in the hope that those who used peat-fuel might be able to furnish pot-ash like those who burn wood. I never was able to detect a single particle of pot-ash in the ashes of peats; but I never failed to find sulphate of magnesia, and frequently the sulphate and subcarbonate in large proportions. Those peats which yield white ashes contain most of these ingredients. Now, peat-ashes are universally used as manure, and mosses are often pared and burnt for the express purpose of manuring them with their own ashes. An efflorescence of sulphate of magnesia is often seen on *moss binks*, that is, the face of moss from which people had been cutting peats.

7. In the essay on manures, referred to in my former communication, I described a species of schistus commonly known under the name of *blaes*, which effloresces into sulphate of magnesia by exposure to the air, and yields a considerable portion of sulphate and carbonate of magnesia from its ashes. I had observed three species of *schisti*, one containing sulphur combined with clay, which oxygenates into alum; another containing sulphur united to iron, which oxygenates into sulphate of iron; and the third contains sulphur united to magnesia, which oxygenates into sulphate of magnesia. Often all these three species are blended in the same mass; and I have had evidence of the hurtful effects of the aluminous and pyritical schistus, if laid upon land before the salts are extracted.

The magnesian schistus is commonly more hard and compact than the others, is of a dark blue or black color, and very much resembles parrot or candle coal. I had once an opportunity of inspecting an experiment on a large scale with this schistus. Being set on fire by brushwood in very large heaps, it burnt with a smouldering flame, and left a great quantity of white ashes, such as the country people call *guests*. These were found to contain a very considerable proportion both of the sulphate and subcarbonate of magnesia. The ashes were laid upon the surface of land in pasture and allowed to remain until the lumps mouldered down. When the land was ploughed, it yielded very extraordinary crops, and the effects seemed every way superior to those of a good liming.

I showed specimens of the sulphate of magnesia in fine crystals, and also of pure magnesia, to the late Dr. Black, which were extracted both from the ashes, and from the efflorescence of this schistus, together with specimens of the materials from which they had been extracted; and that illustrious father of chemical science expressed an opinion that this schistus might be advantageously used for manufacturing the *magnesia alba* of the shops.

My ingenious friend, Dr. Coventry, lately exhibited specimens of this schistus in his class, and mentioned that it was successfully used as a manure in some parts of Fifeshire.

I am aware that burnt clay operates on land as an alterative, and renders it more penetrable both by water and the roots of plants; and that the whole effect is not to be ascribed to the magnesia, or its salt. Lime operates both as an alterative, and as a direct manure. Being capable of combin-

ing with large doses of carbonic acid and other compound gases, it retains these in the soil, and easily gives them over to the roots of plants; and being very soluble with an excess of carbonic acid, it may easily enter the plants along with it. I am inclined to think that magnesia always enters plants in union with some acid, because, in its pure state, it is insoluble in water. But, whatever be the mode by which it enters, it certainly does enter plants; and hence it makes part of their food, or is a manure. In the case under consideration, if we be not entitled to ascribe all the merit to the magnesia, or its combination with sulphuric acid, it must at least be admitted that the presence of these ingredients does no harm.

It is hardly necessary to mention, that the refuse of salt is often used as a manure. It seems now to be ascertained that marine salt contributes nothing to the nourishment of plants, those only excepted which grow in the sea. But the muriate and sulphate of magnesia, and other earthy salts, which abound in the refuse of sea-salt, certainly promote the growth of plants, and are hence applied as manures.

9. An ingenious friend of mine tried the pure magnesia of the apothecaries, and found that it neither did good nor harm to vegetables.

From all these facts I am warranted to conclude that magnesia, in certain combinations, so far from being a poison, is a manure, or pabulum of plants; that when pure, it is inert, doing neither good nor harm. If there be any combinations of magnesia which are hurtful to vegetation, it becomes those who have raised the cry against it to point out what these combinations are, or hold their tongues. It cannot be any state or combination of magnesia that has ever occurred to me in analyzing limestones, or other substances used as manures; for, in all these cases, the presence of magnesia, instead of being hurtful, was apparently highly beneficial.

I remain, sir, your most obedient servant,

JAMES HEADRICK.

Edinburgh, Nov, 2. 1804.

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II.

Strictures on Mr. Headrick's Letter concerning Magnesian Limestone.

Mr. Headrick, in your 20th number, having made some remarks on the prejudicial qualities of magnesian limestone, which, in my judgment, have a tendency to mislead many of your readers, as coming from a person who seems possessed of a considerable degree of chemical knowledge, permit me to state a few things in reply.

The original memoir concerning the prejudicial qualities of pure or carbonated magnesia, when combined with lime, and made use of in agriculture, Mr. Headrick says he has never seen. I beg leave, therefore, to make some extracts from this paper, which, I apprehend, may give Mr. Headrick some account of the rise of the *magnesiæ-phobia*, as he is pleased ludicrously to term it; and perhaps, considering the very high character of the author, may convince him that is by no means so groundless as he is disposed to imagine. Full information of all that is known concerning the bad effects of magnesia, may have a tendency likewise to remove the improper dread of the combinations of magnesia and lime, of which Mr. Headrick complains.

In the Transactions of the Royal Society of London, 1799, Part II. p. 305, *Mr. Smithson Tenant*, a gentleman well known as a most accomplished chemist, first called the attention of the public to the magnesian limestone. He was informed "that, in the neighborhood of Doncaster, two kinds of lime were employed in agriculture, which were supposed to differ materially in their effects. One of these, which was procured near the town, it was necessary to use sparingly, and to spread very evenly over the land; for it was said that a large proportion of it, instead of increasing, diminished the fertility of the soil; and that wherever a heap of it was left in one spot, all vegetation was prevented for many years. The other sort of lime, which was obtained from a village near Ferrybridge, though considerably dearer, from the distant carriage, was more frequently employed on account of its superior utility. A large quantity was never found to be injurious; and the spots which were entirely covered with it, instead of being rendered barren, became remarkably fertile. The different properties ascribed to these two kinds of lime were so very distinct, that it seemed probable they could not be imaginary, and it therefore appeared to be worth the trouble of ascertaining them more fully, and of attempting to discover the nature of the ingredients from whence the difference arose. For this purpose, I procured some pieces of each sort of limestone, and first tried what would be their effect upon vegetables in their natural state, by reducing them to coarse powder, and sowing in them the seeds of different plants. In both kinds the seeds grew equally well, and nearly in the same manner as they would in sand, or any other substance which affords no nourishment to vegetables. Pieces of each sort of stone were then burnt to lime; and after they had been exposed some weeks to the air, that their causticity might be diminished, some seeds were sown in them. In the kind of lime which was found most beneficial to land, almost all the seeds came up, and continued to grow as long as they were supplied with water; and the roots of the plants had many fibres which had penetrated to the bottom of the cup in which they grew. Upon examining the composition of this sort of lime, it proved to consist entirely of calcareous earth. By its exposure to the air for about three months, it was found to have absorbed four-fifths of the fixed air required to saturate it. In the other kind, a few only of the seeds grew; and the plants produced from them had hardly any stalks or roots, being formed almost entirely of the two seed-leaves, which lay quite loose upon the surface. This sort of lime being spread upon a garden soil, to the thickness of about a tenth of an inch, prevented nearly all the seeds which had been sown from growing up, whilst no injury was occasioned by common lime used in the same manner. Upon examining the composition of the substance, which was so destructive to the plants, it was discovered to contain three parts of pure calcareous earth, and two of magnesia."

The above detail will, I think, be sufficient to satisfy any one, that pure or carbonated magnesia, when combined with lime, in the proportion of two parts to three, is prejudicial to vegetation, when used in a considerble quantity as a manure. Mr.

Headrick, however, may be disposed to say, that this proportion is very unusual, as he seems never to have met with it. Mr. Tenant, in his memoir, however, says, that he examined limestones from six different parts of England, which contained magnesia in this proportion, and mentions several others, which, from the accounts he received, are probably of the same nature. Hence it appears likely, that this species of limestone is not of rare occurrence, and of course to be found in Scotland, although Mr. Headrick has not fallen in with it. The contradiction of Mr. Headrick's friend's experiment with the pure magnesia by Mr. Tenant, only adds to the list of experiments carelessly tried: he will probably be induced, from the above extract, to doubt the accuracy of his result, and take the trouble of repeating it with more care, that he may either verify Mr. Tenant's results, or detect his errors.

Mr. Headrick's remark, that it must appear strange to any one endowed with reason, that magnesia, which is evolved by the putrefaction of all animal and vegetable substances, should operate as a poison to plants, seems liable to a number of objections. I shall only, however, give a general answer. A certain proportion of magnesia may not be prejudicial, but even useful to plants, as we have reason to suppose it is, from its always forming a component part of them. But an overdose may here, as in other cases of animals and vegetables, prove mortal to vegetation. Water is a component part of all vegetables, and is required more or less by every plant; but the quantity useful to one plant is destructive to another; what would be a moderate supply to a rush, would destroy heath.

I shall here quote a remark of Dr. Pearson's, contained in a communication made to the board of agriculture, on the use of green vitriol as a manure. Speaking of the qualities of the ashes containing the green vitriol, he says, 'the quantity spread on land is said to be fifty bushels per acre, which I estimate at 2250 pounds avoirdupois; this will give near seven ounces and a half per square yard. If a larger quantity be applied, it is observed it will prove extremely deleterious. This is true also of every other manure, such as lime, alkaline salts, marine salt, nay, of the dung of animals; for if they be used in certain quantities, they *poison* plants, instead of promoting their growth. This is equally true in the animal kingdom, for there is not an article taken as food or as seasoning, which is not a poison, if taken in certain quantities. A human creature may be poisoned or alimented by beef or pudding, according to the quantity of them taken into the stomach. He may be poisoned, or have digestion greatly assisted, by salt or pepper, according to their quantity. In brief, the vulgar notion of the term poison is erroneous; for by it is conceived, that substances so called are in their nature positively destructive of life; but the truth is, that the most virulent poisons are, in all reason and fact, only deleterious according to the quantity applied. White arsenic, swallowed in the quantity of ten grains, or less, will destroy life; but in the quantity of one sixteenth of a grain, it is as harmless as a glass of wine; and further, in that dose is a remedy for inveterate agues.'

What has been asserted, therefore, concerning the prejudicial qualities of magnesia, applies only where the magnesia is in very considerable proportion to the calcareous earth. In the course of my analysis of limestone, I have generally, in the very best stratified specimens, detected a certain proportion of this earth; and from experience can say, that where it exists in the proportion of one tenth to the calcareous earth, such lime may be used, upon fields of a light loam, at the rate of 500 Winchester bushels, slacked, per acre, with great advantage.

As to what is said by Mr. Headrick respecting the use of ashes containing magnesia in the state of sulphate, he must readily perceive that this by no means determines against the prejudicial effects of carbonated or pure magnesia. Every one allows the efficacy of pure or carbonated lime as a manure; many doubt that of sulphate of lime or gypsum. Clay is a good soil; but sulphate of clay, or alum, (I take no notice of the portion of alkali contained in this salt,) as Mr. Headrick himself acknowledges, is destructive to plants; wherefore, although sulphate of magnesia may be useful to vegetation, it does not follow, that pure or carbonated magnesia is not hurtful.

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A BANFFSHIRE AGRICULTURIST.

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III.

Magnesia not hurtful to Vegetation.

I beg leave to express my obligations to your Banffshire correspondent, for having brought forward the original documents on which the alarm respecting the deleterious effects of magnesia has been founded. But though I give full and implicit credit to the statements both of *Mr. Smithson Tenant*, and of your correspondent, I am disposed to draw conclusions from their premises very different from those which have occurred to them.

It appears from Mr. Tenant's experiments, that plants grew in the magnesia, and in the common limestone, when reduced to powder, equally well as they would have done in sand. In this case, I presume, both the lime and magnesia were in the state of carbonate, or saturated with what was formerly called fixed air, now carbonic acid. It appears, then, that the carbonate of magnesia, even when combined with the carbonate of lime, exerted no pernicious influence on the growth of plants.

It was only when the carbonic acid was expelled, by burning the stone, that the deleterious properties of the magnesia began to manifest themselves. Now, I do not see how pure magnesia can exert any influence whatever on the growth of plants. It is nearly insoluble in water, and hence cannot enter into their roots. It recovers its carbonic acid much more slowly than lime; and unless it meets with some vegetable, animal, or mineral acid in the soil, with which it may combine, and become soluble, it is only after it has combined with an excess of carbonic acid, that, like lime, it becomes soluble in great quantity, and can enter, with water, into the composition of plants.

But it is unnecessary to enter into any theoretical reasoning to account for the facts stated by Mr. Tenant. It is well known that different soils require a very different management in the application of lime. Some soils would be much benefited by small doses frequently repeated; but would be utterly destroyed by an excessive application. On other soils, again, it is hardly possible to lay too much lime. But I shall endeavor to il-

lustrate this position, by stating two cases in point, which fell under my own observation.

In the neighborhood of Sterling, soils are distinguished into *carse* and *dryfield*. The carse is a tenacious alluvial clay, which occupies the extensive plain through which the Forth performs his whimsical meanders. It had been an immemorial practice to lay great doses of lime on the soil; but my father was the first person, in the district north-west from Sterling, who ventured to put lime on dryfield land. His soil had been mostly formed from the decomposition of red and brown sandstone, and was a friable loam inclining to sand, and in some cases to gravel. A field being fallowed, and put in good order, the lime-shells were dropped over it in heaps; and, after they had slacked in the air, the lime was spread over the surface with spades. The same quantity was applied, and the same mode of application was adopted, that had long been practised in the carse lands. Wheat was sown; but except in a few spots, which had escaped an excessive dose of lime, none grew. It was long before this field recovered its fertility; and the bottom of the heaps remained sterile during many years. The opinion of the people there, that lime would destroy dryfield land, was completely confirmed. But the failure of his first experiment had no effect upon my father. In his future operations, he slacked his shells beside a pool of water, and then spread the powder equably, and in moderate quantity, from carts. The effects were both striking and highly beneficial.

The other case occurred in Lanarkshire. A flat piece of land, consisting of what farmers call a cold till, being mostly formed from the decomposition of blaes, and other clay strata which usually accompany coal, was contiguous to a rising ground, consisting of what farmers would call a sharp turnip soil, in some places shallow, and incumbent on red and brown sandstone. About two thirds of each of these pieces of ground had been limed on the sward, while in pasture in the heap way, already described. The remainder of both was limed, by spreading the powder from shovels. They were both ploughed at the same time and sowed with oats. Where the lime heaps had stood on the till soil, the crop grew with the utmost luxuriance, and continued green after other parts of the field were ripened; but where the heaps had stood, or an excessive dose had been applied to the other soil, nothing grew at all; and this distinction remained clearly marked, not only while the fields remained in crop, but even after they were thrown into grass and pasture. The parts lined by shovels, exhibited an equable fertility, though greatest in the till soil where most lime had been applied, and diminished in the other, where more than a certain quantity had been used.

This limestone contained a small portion of magnesia, though not apprehending any evil from it, I was at no pains to ascertain its proportion.

It is not stated that any bad consequences resulted from applying the magnesian limestone of Doncaster in moderate quantities; but the contrary. In the cases I have stated, it appears evident, that the opposite effects of the lime did not arise from magnesia, or any poisonous ingredients whatever in its composition. The effects can only be ascribed to the opposite qualities of the soils; one requiring a very large dose, and the other being only capable of melioration from a very moderate one. In short, what added great fertility to the one soil, was found utterly to destroy the fertility of the other. I am therefore inclined to think, that the pernicious effects of the Doncaster lime are not to be ascribed to magnesia, but to the quality of the soil to which it was applied, which rendered it incapable of receiving a large dose. But as I mean to show, positively, that magnesia, instead of being a poison, is a food of plants; to account for all the facts stated by your correspondent, I am inclined to admit, that an overdose of this substance may prove more injurious to certain soils than an overdose of lime. Magnesia, and lime, and indeed any of the primitive earths, are known to be, of themselves, the most infertile of all soils. Though no soil is fertile without lime, its excess produces sterility; and the most fertile soil is formed from a variety of the primitive earths, combined in certain proportions, yet unknown. It is extremely probable that a certain proportion of magnesia, as well as of lime, contributes to the fertility of soils; though there may be some soils which an overdose of magnesia may more readily injure than an overdose of lime. From this supposition, I am disposed to account for the fact, stated p. 150, that lime, which contained two parts of magnesia to three of lime, proved injurious, while an equal quantity of pure lime proved beneficial: not that the magnesia was hurtful in itself, but that the soil might have been previously saturated with it, so that a new addition proved hurtful. In all cases of this sort, the nature and qualities of the soil should be examined and stated, as well as of the substances applied to it. From the facts I have stated, it might as rationally be inferred that lime, as that magnesia, was a poison to plants, when applied to certain soils. There are certainly soils where an overdose of lime will prove as injurious as an overdose of magnesia.

But that magnesia, so far from being a poison, is a pabulum of plants, or promotes their growth, in addition to the facts adduced in the paper which forms the subjects of your correspondent's criticism, may farther appear from this circumstance—that the refuse of magnesian works, in this part of the country, is eagerly sought for and applied as manure. Are we to suppose farmers so blind and stupid, as to persevere in applying poison to their crops, in place of nutriment?

If any doubt is entertained respecting the accuracy of the experiments alluded to in my former communication, I shall proceed to detail them in the author's own words. They were made by Andrew Steele, Esq. W. S. at the time the alarm about magnesia was at its height, and had found its way into your useful work.

'On 26th April, 1801, I sowed two pots, containing the

1st, $\frac{1}{10}$ magnesia, the rest earth.

2d, $\frac{1}{10}$ lime, the rest earth.

'The plants in the pot containing magnesia, I find recorded in my book of experiments, throve better than those in that which contained the lime.

'This might arise from some particular and imperceptible circumstances; but I esteemed it sufficient for my purpose to have ascertained, that magnesia is neither poisonous to the seeds, nor obstructs the growth of grain.

'The same year I tried magnesia spread on the

surface of grassy turf, and an equal quantity of lime spread on a similar extent of other grassy turf; but could discern no difference in their effects during the summer.'

After we had considered your correspondent's criticisms, the same gentleman, in conjunction with myself and others, instituted a new set of experiments.

On 22d May 1806, six pots were sunk in a garden plot, and each had inserted nearly an equal number of the seeds of oats and peas.

No. 1. The standard, contained simple earth.
2. Magnesia, by measure $\frac{1}{12}$ mixed with earth.
3. Do. — — $\frac{1}{6}$ do.
4. Sulphate of magnesia $\frac{1}{10}$ do.
5. Do. — — $\frac{1}{20}$ do.
6. Muriate of magnesia $\frac{1}{20}$ do.

This 30th June 1806, the peas are not so thriving in any of the pots as in Nos. 2 and 3, which contained carbonate of magnesia, or the [common] *magnesia alba*, of the shops. They are not so vigorous in No. 2, which contained only $\frac{1}{12}$ of magnesia, as in No. 3, which had $\frac{1}{6}$, where they are more than a foot in length. This shows, that magnesia is analogous to lime, in powerfully promoting the growth of leguminous crops.

The oats in No. 2 are taller, more vigorous, and of a deeper green, than in No. 1. In No. 3, they considerably surpass the two others in these particulars.

This clearly shows, that carbonate of magnesia powerfully promotes the growth of oats and peas; and that, in this particular case, the greater the quantity applied, the more striking the effect.

Nos. 4, 5 and 6 remained long dormant, probably owing to an excessive dose of the magnesian salts. The oats in No. 6 first began to spring; and, though not so tall, are vigorous, and of a lively deep green color. This shows, that though muriate of magnesia may be applied in excess, it is not in itself hurtful, but beneficial, to vegetation.

The oats in No. 5 have lately begun to spring; and those in No. 4 are now making a rapid progress. Their retardation does not show that the sulphate of magnesia is hurtful; but that too much of it has been applied.

I suppose earthy salts, especially those of magnesia, operate chiefly by their strong septic power, in promoting the putrefaction, and converting into nourishment for plants, those animal and vegetable substances which exist in the soil. It is well known that sea-salt, which is much contaminated with muriate of magnesia, instead of preserving, promotes the putrefaction of meat, and especially of fish. It is also probable these earthy salts may promote vegetation, by their deliquescence and attraction for moisture. This remark is particularly applicable to the muriate of magnesia, whose plants are now making a very rapid progress, and the earth seems moist.

But whatever errors we may commit in accounting for the mode by which these substances operate, I think the facts adduced clearly establish this position: That magnesia, and most, if not all of its saline combinations, so far from being hurtful, are beneficial to vegetation, if used in due proportion.

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JAMES HEADRICK.

Edinburgh, 30th June, 1806.

IV.

Magnesia and Magnesian Limestones.

From Davy's Agricultural Chemistry.

The subject of the application of the magnesian limestone is one of great interest.

It had been long known to farmers in the neighborhood of Doncaster, that lime made from a certain limestone applied to the land, often injured the crops considerably, as I mentioned in the introductory lecture. Mr. Tennant, in making a series of experiments upon this peculiar calcareous substance, found that it contained magnesia; and on mixing some calcined magnesia with soil, in which he sowed different seeds, he found that they either died, or vegetated in a very imperfect manner, and the plants were never healthy. And with great justice and ingenuity he referred the bad effects of the peculiar limestone to the magnesian earth it contains.

In making some inquiries concerning this subject, I found that there were cases in which this magnesian limestone was used with good effect.

Amongst some specimens of limestone which Lord Somerville put into my hands, two marked as peculiarly good proved to be magnesian limestones. And lime made from the Breedon limestone is used in Leicestershire, where it is called hot lime; and I have been informed by farmers in the neighborhood of the quarry, that they employ it advantageously in small quantities, seldom more than 25 or 30 bushels to the acre. And that they find it may be used with good effect in larger quantities, upon rich land.

A minute chemical consideration of this question will lead to its solution.

Magnesia has a much weaker attraction for carbonic acid than lime, and will remain in the state of caustic or calcined magnesia for many months, though exposed to the air. And as long as any caustic lime remains, the magnesia cannot be combined with carbonic acid, for lime instantly attracts carbonic acid from magnesia.

When a magnesian limestone is burnt, the magnesia is deprived of carbonic acid much sooner than the lime; and if there is not much vegetable or animal matter in the soil to supply by its decomposition carbonic acid, the magnesia will remain for a long time in the caustic state; and in this state acts as a poison to certain vegetables. And that more magnesian lime may be used upon rich soils, seems to be owing to the circumstance, that the decomposition of the manure in them supplies carbonic acid. And magnesia in its mild state, i. e. fully combined with carbonic acid, seems to be always a useful constituent of soils. I have thrown carbonate of magnesia (procured by boiling the solution of magnesia in super-carbonate of potassa) upon grass, and upon growing wheat and barley, so as to render the surface white; but the vegetation was not injured in the slightest degree. And one of the most fertile parts of Cornwall, the Lizard, is a district in which the soil contains mild magnesian earth. The Lizard Downs bear a short and green grass, which feeds sheep producing excellent mutton; and the cultivated parts are amongst the best corn lands in the county.

That the theory which I have ventured to give of the operations of magnesian lime is not unfounded, is shown by an experiment which I made expressly for the purpose of determining the true

nature of the operation of this substance. I took four portions of the same soil; with one I mixed $\frac{1}{20}$ of its weight of caustic magnesia, with another I mixed the same quantity of magnesia and a proportion of a fat decomposing peat equal to one-fourth of the weight of the soil. One portion of soil remained in its natural state; and another was mixed with peat without magnesia. The mixtures were made in December 1806; and in April 1807, barley was sown in all of them. It grew very well in the pure soil, but better in the soil containing the magnesia and peat; and nearly as well in the soil containing peat alone: but in the soil containing the magnesia alone, it rose very feeble, and looked yellow and sickly.

I repeated this experiment in the summer of 1810 with similar results; and I found that the magnesia in the soil mixed with peat became strongly effervescent, whilst the portion in the unmixed soil gave carbonic acid in much smaller quantities. In the one case the magnesia had assisted in the formation of a manure, and had become mild; in the other case it had acted as a poison.

It is obvious, from what has been said, that lime from the magnesian limestone may be applied in large quantities to peats; and that where lands have been injured by the application of too large a quantity of magnesian lime, peat will be a proper and efficient remedy.

I mentioned that magnesian limestones effervesced little when plunged into an acid. A simple test of magnesia in a limestone is this circumstance, and its rendering diluted nitric acid or aqua fortis milky.

From the analysis of Mr. Tennant it appears that the magnesian limestones contain from

20.3 to 22.5 magnesia.
29.5 to 31.7 lime.
47.2 carbonic acid.
0.8 clay and oxide of iron.

Magnesian limestones are usually colored brown or pale yellow. They are found in Somersetshire, Leicestershire, Derbyshire, Shropshire, Durham and Yorkshire. I have never met with any in other counties in England; but they abound in many parts of Ireland, particularly near Belfast.

For the Farmers' Register.

ANOTHER WAY OF FATTENING HOGS.

It has been often said of the Dutch farmers in the State of New York, and of the German farmers of Pennsylvania, that in many very important branches of their business, they indolently follow, from generation to generation, those imperfect customs and ways of their forefathers, which grew out of that rude state of things, belonging to the settlement of an interminable wilderness, and which were adopted from the necessity of the case. I think the extraordinary manner in which hogs are permitted to run at large in Virginia, is as strong an instance of veneration for ancient customs, as can be produced in the more northerly states. Certainly as far as that laudable feeling has any thing to do with the matter, the ancient dominion maintains its reputation well, for the observation is not united to particular localities, but appears to apply to every part of the state, east of the mountains.

The custom of letting sows pig in the woods, and then suffering them to get a precarious living there for the next twenty months, grew out of the necessity of the thing, when the first settlements were made. The planters in those times had constantly to provide against dangers which even menaced their lives. It would be unreasonable to suppose that the sort of management and economy of means which are successfully practised in our days, could be carried by such men into the details of their farming affairs. They were too much engrossed with *keeping the country* for their posterity. Bacon, however, they could not well do without, and it was the least disadvantageous way to procure it, to let the hogs run at large and feed upon the mast, which sometimes, but not every year, is very plentiful. Yet even this advantage was purchased very dearly. If we look back to the various legislative enactments on the subject of these animals, we can form to ourselves some idea—far short of the truth I imagine—of the anxiety, the trouble, the loss of time and temper, the quarrels, the occasional loss of life, which produced these enactments. In the Statutes at Large, it appears, in 1632, only twenty-six years after the first settlement of Virginia, no man was allowed to kill a hog except on his own plantation. This enactment no doubt was suggested by the misunderstandings of the planters. In 1642, any man killing hogs on his own land, was obliged to call in two witnesses to ascertain that the hogs were unmarked. Any man convicted of killing a tame hog, not his own, was to "suffer as a felon." This punishment was afterwards commuted to a fine to be paid to the owner of the hog, of one thousand pounds of tobacco, and another thousand pounds to the informer. In case of inability to pay, the offender was *to serve* the owner of the hog one year, and the informer another year. And any person bringing home a hog or hogs without ears, was to be proceeded against *as a hog stealer*.* In 1674, the Indians were ordered to put such a mark on their hogs, as the county courts should direct; and that Indian proof was in future to be good against Indians, to convict them on the act against hog stealing. In 1679, these laws not being sufficient, it was enacted that any one taken a third time stealing hogs, should be tried by the laws of England, as in case of felony.

We are now almost in the middle of the nineteenth century; every man who has got a home, can live under his own vine and fig-tree, secure in his possessions, fearing no violence, and not under the necessity of intending any to others; still the sows pig in the woods, still the unhappy shoats that have survived one winter, are running, three quarters legged, up and down the woods hunting and screaming for the mast that did not happen to grow this year; some with their ears notched on one side, some on both, some a quarter clipped off, some half, some without ears as if they had stood in the pillory. Then comes November, that hog trotting month, to the small farmer.

"Have you seen my old white sow?"

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* In 1666, it was enacted that if any Indian crossed the bounds of Henrico county, after notice given of the establishing of the bounds, "it shall be lawful for any Englishman to kill such Indian or Indians so transgressing." Thus an Indian looking for his hogs over those bounds, might be killed according to law. This law was not passed in relation to hogs, but private murders committed on the English.

"I can't say I have."

"Well, they telled me she was seen at your place about harvest time."

"Why there was a strange sow rooting in my sweet potatoes in August: what marks had she?"

"Her left ear rotted off last winter, and she had a considerable gash in the right one."

"Ah, I guess that was not your sow then, for this had lost both her ears, and had seven shoats, mighty bad varmint all of them for squeezing through the rails."

"Well, then, that *was* my sow, for when she lost her left ear, she looked so like Jim Carpenter's that I cut her 'tother ear off too in March last, when she had six good shoats and a runt with her."

"Well, I don't know where she is, I know nothing about your hogs. Here, Paul," (calling his black man) "have you seen Mr. Smith's hogs?"

"No masser, I nebber see him since we turn him out of 'tato patch."

Now Paul being a leading man in the church, Mr. Smith had nothing left for it but to believe him; and as soon as his master went to the house, having a high opinion of Paul's stock of veracity, he thought he would purchase some of him, and taking him to the edge of the woods, he said "Paul, I'll believe what you say, and here's a quarter if you'll tell the truth. Where's the hogs now? I'll never say you told me."

"Well den, masser, de fac is, de sow and de runt is in de old field by the branch at Mr. Jinkins'. I seed 'em day before yesterday. But where de oder shotes is dat is unpossummel to tell."

"Will you help me to drive 'em home?"

"It an't not possummel to drive neider of em, dat is de fac, masser—for de runt hav lost bote de fore feet, and old sow hav he leg broke."

"Well, now, who the devil has done this?

"I think he is possummel, masser, somebody fire buckshot at 'em. Old sow, masser, and all de shotes was so mischievous, and thin, and so hungry, 'ere is no fence to stand 'em. By golly, I nebber see de like, he turn him on his side, and squeeze him trough the fence jis as a par of tongs."

"You're an infernal set of devils as ever lived. I was told that you and your master had shot three of the shoats, and had sold their carcasses to a wagoner that was going along. But I'll sarve you all properly for this."

This is no sketch from fancy; but a relation of what occurred between neighbors this fall, and part of the dialogue took place in presence of the writer of this paper.

Then the planter with his large family of negroes to sustain. He, to be sure, gives his shoat something to eat the first winter; but it is wastefully done. Corn is thrown to them in the ear, and most of it is swallowed uncracked, and is never digested. Many of them, however, are kept alive, and though thin enough, they count for hogs. It would be bad policy to turn them into the woods in good order. The negroes are very apt to take a severe tithe of them. But what trouble, what loss has the planter to encounter before his pork is killed, and then what sort of hogs does he put up for bacon? Miserable things, weighing 120 to 140 lbs. How long does his raised bacon last? How many hundred dollars have too many of the large planters to pay for purchased bacon to keep his gangs with? Is it not possible for him to raise his own bacon, and save all this money? Is it not a reproach that all this should be so, in a country where the soil and the climate are so favorable to the production of Indian corn, that it may be considered the staple commodity, from which another great staple might be made for exportation—pork.

Although what is now about to be stated may be considered by some readers as a gasconade, the writer will notwithstanding close this paper by communicating *another way of fattening hogs*, which any one can imitate, and every one can succeed in if he chooses to try the experiment. He is not going to propose an experiment, he is going to narrate a method he has often seen practised, and often witnessed the success of. It must be remarked that the breed of hogs and cows necessary to the success of this process, is not that which offends the eye of every man accustomed to good stock, and of which too much is seen in Virginia. The hogs may be of that mixture of the Chinese and grass breed, so abundantly found in the state of New York; and the cows must not be starved neglected animals, hardly alive when the spring opens, and of which it takes seven to give six quarts of milk. There are good cows in Virginia, and they only require to be kept up in hard weather, and well kept through the year, to keep their owners. Such cows ought to give twelve quarts of milk a day each.

No hog should run loose, the sties should be convenient, warm and easy to clean out. Only one sow in a sty large enough to contain eight or nine well grown animals. It should be contrived that the sows pig about the time the calves are taken from their mothers, or not later at any rate than the cows calve. Every sow about to pig must be well fed three times a day, with coarse meal, potatoes, garbage, &c., mixed up in the swine tub: they will then have plenty of milk for their pigs. Have your inferior and other grain, such as corn and rye, ground coarsely in sufficient quantities, and put into one or more hogsheads mixed with water, and stirred well; if it is a little sour the better. As soon as your pigs begin to grow and drink at the trough, give them a little of this mush mixed with new milk, and increase the quantity as they grow, until you give them every day as much as they seem to require. To be able to do this, you must have three or four spare cows, the whole of whose milk for the first ten weeks may be given to the pigs. When the sow finds the pigs strong and troublesome, she will fight them off; it is best then to take her off, and put the sows in a sty by themselves. If you wish to fatten them and change your sows, or breed the next year from favorite sow pigs, feed them out of the hogshead. Swine fatten much faster in warm weather, and do not eat much when they are taking on fat. A stout sow, one of those deep-bodied and short-legged animals, will raise, if well fed, eight pigs. Pigs thus treated, which have been pigged about the 25th of March, will at Christmas, when at nine months old, average 400 pounds weight each; and pork of this kind will fetch the very best price to put up for mess pork, perhaps double what you have to pay for such as it may be preferred to consume on the plantation.

The writer of this paper repeats that he has seen this done for many years in succession: once

he saw a lot of pigs average 410 pounds. Let the planters think of this, and some of them try the experiment fairly for one year, and publish the result. And let them not forget the real pleasure they felt at seeing business properly done, at observing fine animals daily prospering, with a promise of sure reward. Let them not forget how much anxiety and trouble they have saved; how much destruction of crops and fence-mending they have prevented. Neither let them forget what an advantage this system of pork feeding may prove to Virginia. Let something be done for the sake of the country: there would be some patriotism in an experiment of this kind, better than a good deal of that Roman patriotism, sometimes talked of in the newspapers; at least, it is my opinion, and I am of Roman descent, as my signature will show. MARK-US, PORK-US, BRUT-US.

AN EASY METHOD OF SOWING GRASS SEEDS.

To the Editor of the Farmers' Register.

To fulfil a duty, which I consider every subscriber to your valuable paper owes, I send you the following description of a box or machine which I have used, and still continue to use, for sowing herd's and other similar grass seed. It is true, I am but a novice in farming as well as in most other things; but as the following remarks are not calculated at least to do much injury, and it is possible they may be of service to some, I have determined to write them, right or wrong. From the commencement of my farming career, (which, however, does not exceed five years,) I have found the sowing of grass seed to be exceedingly tedious; and, indeed, unless in very favorable weather, very difficult to sow with any degree of accuracy or regularity. This difficulty and uncertainty induced me to inquire, if there was no other way to sow them, except with the hand, as they are commonly sowed; but could get no satisfactory information. I then attempted to use a long box with a tin bottom, having holes punched through it at distances of half an inch each way. With this I found I could sow much faster than with the hand, but with no more regularity, because the wind had the same chance of blowing the seed about, before they could reach the ground. Throwing the box aside; I had a piece of sheet iron about four feet long and twenty inches wide, punched with small holes at distances of about half an inch or three quarters each way, and then made into a cylinder similar to a stove pipe. An axle passes through the cylinder, on each end of which is attached a wooden wheel of double the diameter of the cylinder, and on each end of the axletree are fixed the handles or frame by which the machine can either be pulled after, or rolled before the seedsman, as he may prefer. A cylinder four feet long and six inches diameter, will hold rather more than a half bushel of seed, and will sow about a bushel to the acre.* Here let me observe that the seed should be very nicely sifted—for if there be much filth or chaff left in the seed, they will not be sowed thick enough. The seed may be put into the cylinder either by taking off one wheel or by having a door cut in the cylinder after the manner of the barrel churn.

Since using this grass sower, (if I may so call it,) I find the grass is sowed more regularly, that much time and labor is saved, and it is almost impossible for the wind to affect the seed at all, since they are nearly touching the ground by the time they are out of the box.

I should be very much pleased for some person to furnish the Farmers' Register with a full and correct mode of the management of meadow lands, and also, the best time for seeding and the most approved manner of curing the different kinds of hay. B. S.

* The holes should be about the size of those commonly punched in tin for safes.

PRACTICAL EFFECT OF SEASONABLE FARMING.

From the Columbia (Kinderhook) Sentinel.

I have heretofore enjoined the necessity of seasonable farming, because I have repeatedly compared the appearance of farms thus cultivated with others, perhaps naturally as good, but which by a different course of management—that is when all the work was done late in the season, or in other words, not until the owners were driven to it—the difference made in every instance is so manifest, and so much in favor of the "go ahead" farmer, that I have often been astonished that the example of the latter was not always followed. Reflections of this nature have occurred to every farmer of the least observation; and if there are some who yet *practice* delay in their work, I trust they will not also *advocate* it as the best method. It is not in one branch of agriculture alone that the effects of this kind of management have been observable; it extends through all the operations of the year, and uniformly results in this—while the one makes money, the other is gradually becoming poor. I now design to give a practical illustration of this rule, exactly as it has occurred in this vicinity, and as I mean to state simply *facts*, I trust no one will accuse me of exaggeration.

Within a few miles of my residence are two farmers, who each have a field of corn, and as I have often seen them at work in their respective lots during the season, I am enabled to state the method of cultivation pursued by each. First, the soil of both was that of our pine plain—a mixture of sand and gravel, but the largest proportion is sand. The two pieces were both sod, or land put down to grass; one had been in grass two years, the other longer, but in both, previous to ploughing, the grass was abundant and vigorous. If a choice had been offered me of either of the lots for a crop of corn, I would have selected the one which had been the longest in grass, not only on this account, but because I thought it more inclined to loam than the other lot. Now what I will call the best lot, for such I really conceived it to be, was ploughed late and with two horses. It then lay sometime before planting, and the grass was beginning to sprout. It was now furrowed and planted. The corn as it came up had to encounter the grass, which had the start of it, and was permitted to grow sometime, so that at the first hoeing the former was small and sickly. However, at a late day this operation was performed, and before the last of the field was finished, the grass in the part first hoed had become vigorous. The plough was after this occasionally used, but never until the grass shoots were so numerous and large as to interfere with the young sprouts of corn. This field has now come to maturity, and if the owner

gathers fifteen bushels to the acre, it will be more than he has a right to expect, and certainly as much as he can possibly gather from it.

We will now go to the other field, which has been subject to another kind of management, and see the difference in product. The poorest lot as I call it, was not ploughed early, though in good season, with three stout horses. Immediately after the ploughing, the harrow was applied, and after that it was furrowed and planted. As soon as necessary the corn was ploughed and hoed; the plough was likewise used once or twice afterwards, and always in season, for the object was to keep the young plant clean of grass and weeds, and thus give it not only the entire surface of the ground for its growth, but the roots all the strength for their nourishment that the soil would afford. This field of corn having come to maturity, is a good, though not a heavy crop. It will yield, I think, between forty and fifty bushels to the acre. Comparing the two fields together, therefore, the advantage is two-thirds in favor of the seasonable farmer over his more tardy neighbor. Should I be asked which of these to farmers labored the hardest on his farm, I would answer promptly, the man who has the poorest piece of corn; because I notice he does all his work late, and is driven by it so that he is always in a hurry, whilst the other, taking "time by the forelock," seems to have plenty of leisure and takes things easy. In circumstances they are much like other respective pieces of corn; and the disparity between them must become greater and greater, unless the one will imitate the example of the other.

Reader, I have not amused you with a fictitious story. I have stated only the naked truth, without a particle of exaggeration; and it is not necessary for you to visit these two fields of corn to corroborate what I have said. You have only to look around you, and by drawing a comparison you will see the difference between a field of corn or every other kind of grain on which the work has been done properly and in good season, and another where the labor has been performed not only out of season but in an improper manner. A.

ECONOMICAL METHOD OF EXCAVATING DITCHES, CANALS, PONDS, &c.

Translated for the Farmers' Register, from the *Journal d'Agriculture, etc., des Pays-Bas.*

Seven or eight years ago, having a considerable number of ditches to make, I sought a mode of lessening my expense. As I had had occasion to compare the small quantity of earth removed by any digging tool with that which is displaced by a plough, I thought of employing the latter instrument for the excavation of my ditches; and I was so well satisfied with it, that, from that time, I have always used it with success in cleaning out my ditches, or loosening the earth for the establishment of new courses.

The process is very simple: I set up stakes at convenient distances, and stretch a cord along them that the horses may exactly follow the desired line; men with shovels afterwards throw out the earth loosened by the plough; and, to avoid confusion, a certain number of stakes is alloted to each of these men, and within the limits of these, his labor is confined. As the plough sinks deeper, it is withdrawn from the edges of the ditch according to the slope intended to be given. The plough is laid aside when it has reached to within two or three inches of the required depth; and then the workmen make use of the customary tools to level and finish off the work.

[We have had some experience in using the plough for cutting ditches, and have found its operation to surpass that of spades, in efficiency and cheapness, as much as horse labor in other things is preferable to that of man alone. The plough, however, cannot be used in situations where ditching is most often required.

Our northern countrymen have long known and profited by the use of the plough and scraper for such operations as making and repairing roads, digging canals, constructing dams, &c., which are executed in lower Virginia, almost exclusively by hand labor. In this, as in many other respects, we might greatly profit by the example of our northern brethren, whose necessity, in the scarcity and high price of their labor, has served as the faithful mother of many valuable inventions.]

REMARKS AND QUERIES ON IMPROVEMENTS IN FARMING.

To the Editor of the Farmers' Register.

Caroline county, Nov. 12, 1833.

I have known a physician who could astonish the admiring multitude, seated around him, with his intimate acquaintance, with the causes, symptoms and treatment of the various diseases to which the human body is subjected; he could relate the different symptoms belonging to each stage, name the remedies, he could allow for the difference of constitution, age and temperament. All derangements could be so exactly described, and the appropriate remedies named, that you would have supposed this must be an excellent physician; but he was not: when brought to the bedside of a patient, you might see him frown and twist, and turn, and seem impatient and anxious. Why? He was puzzled to find out whether *this* patient, was in this or that *state*, in which this or that *remedy* is proper! I have known the same of a lawyer: seated by a good fire of a winter evening, he could tell you so much of law, &c., that you might suppose in law matters, you might venture your all upon him; yet, put a case in his hands, he would appear at a loss and scarcely be able to manage the plainest cause. So it is with farmers: I have observed, that those who may talk most plausibly about the management of a farm, are not always the most successful agriculturists. Some farmers have their minds so much occupied with the *whole* system of agriculture, that they are not successful in any *one* part; others are so engaged in *one* particular branch, that there is a total failure in the system as a whole. I am reminded here of an expression of Bonaparte; he said, "with him, Murat was every thing; without him, he (Murat,) was nothing." It seems from this, that Murat could execute with courage, but not plan; yet we cannot say of the other, that he could plan and could not execute, for we know he could do both. So I presume, there are some farmers, who have both planned and executed, and from such would I gladly learn, for in such would I have confidence. After premising so much, I will come to the point: being more like Murat than Bonaparte, I will be thankful for a Bonaparte of a farmer, to plan for

me the management of my farm. I suppose there are 400 acres rich and poor which may be ploughed; it may be conveniently divided into four fields. I have not more hands than enough to cultivate about 100 acres a year; upon these 400 acres, I must keep my horses, hogs, cattle and sheep, the number of each I wish to know. The farm lies on the North Anna River, it has been a first rate farm for the section of country—but little flat land on it, scarcely an acre for wet meadow. The land waving and some steep, and where not worn by improper cultivation and washing, very strong, well adapted to corn and wheat. Plaster, I am told acts well upon it. Well watered with a number of excellent springs, and perhaps (lying in a great bend of the river,) it is ⅔ or more surrounded by the river. One-shift was cultivated this year, 1833, in corn; it is not shucked out; there will be at least 150 barrels of corn; most persons who have seen the corn, think near 200 barrels. We have seeded the corn land in wheat; it is nicely put in, 65 bushels seeded. A good part of the shift for corn the next year, 1834, is in clover, ribwort, running briers, &c. We are fallowing it at this time with a McCormick plough, No. 10, three strong horses to it. I think where the land is rich and the coat thick, it is ploughed six or seven inches deep: where the land is thinner, it is directed that the ploughing be not so deep. Now I want a system which will not suffer the good land to deteriorate, and which will enrich the poor. I am willing to resort to some extra labor upon the very poor, especially such as is in sedge. What is best to be done with that for speedy recovery? I am willing to clover and plaster. How? Should any other grass be seeded with the clover in February; on the wheat land, I suppose I shall be compelled to graze one-shift for a longer or shorter time. How? How must hogs be managed, &c.? I hope some experienced farmer will make the case his own, and for my benefit, and for a thousand more, lay down a plain practicable system for me, and I will promise him if I am convinced, I will steadily pursue his plan. T. B. A.

What is the smallest water power that can be profitably applied to the grinding of grain or gypsum?

Please insert in the "Register," and recommend its solution by some competent person, the following query, as your intelligence will at once see its connexion and utility with the farming interest. Mills both for grain and plaster are absolutely necessary. *Verbum sat.* A gentleman wishes to build a small mill, on a very small but never failing stream, and fears the stream is not sufficient; he can readily catch the water in a barrel as it runs, and measure by time. Querry? What is the smallest quantity of water (by gallons,) per minute, should a stream vent in its ordinary course (no dam,) to drive with sufficient velocity and power, a four feet stone by a 20 feet over-shot wheel, with the ordinary geer? T. B. A.

From the Alexandria Gazette.

We are pleased to learn that scientific gentlemen, who have lately visited the newly discovered coal region on the borders of the Potomac, in Berkeley and Morgan counties, have expressed their opinions that the coal is of a most excellent quality, and the supply is likely to be inexhaustible.

REMARKABLE METEORIC PHENOMENA.

For the Farmers' Register.

So numerous have been the published accounts of the meteors which appeared on Nov. 13th, that nothing now can be offered either interesting or novel on that subject. But so wonderful an appearance ought to be recorded in a work like the Farmers' Register; and I offer my own impressions, as they were written in the course of the same day, and before any other person's account had been heard, to confirm or contradict them. More full and perhaps more correct observations may have been made by others—nevertheless, I have chosen to present merely what I then saw and believed, without remarking on any different impressions made on their observers, or adding any later opinions. I will only observe generally, that in all the accounts yet seen, there is a remarkable general agreement in description: and though many particular facts are made to vary, or were noticed by only a few persons, there is no greater difference of testimony than is inevitable under such circumstances. It was impossible for the eyes of any one person to see one-tenth of the space which was filled with these appearances, even if full and accurate observation could have been bestowed on all that actually met each person's view. A digest of many different accounts, proceeding from various parts of the great region of the globe over which these meteors were visible, may be prepared hereafter, for publication.

I was called at the earliest dawn of day, (Nov. 13th,) by a terrified servant, to see what a number of "stars were shooting." I quickly went out of doors, and beheld the most magnificent as well as the most strange appearance of the heavens, that I had ever heard of, numerous and wonderful as are the recorded accounts of meteors.

Streams of light, similar in brilliancy and swiftness to what are well known as *shooting stars*, were flashing into view and immediately disappearing in every quarter of the sky. During the whole time that I continued to watch, perhaps half an hour, it seemed that there was never an instant in which some one of these arrows of light was not visible in every quarter, and generally at least three or four—sometimes a much greater number. But this estimate was not made at the moment, and indeed astonishment and admiration at witnessing so glorious a sight, left little opportunity for calm calculations, even if the eye was to be trusted to estimate such numerous and evanescent appearances.

It seemed as if every light proceeded in direction from one common point in the heavens, which was about the same as the sun's meridian place, at midsummer. But that place was marked by fewest of the streaks of light, and indeed, I am not sure that any began to show precisely at the imaginary centre, from which they diverged equally to every quarter. The whole horizon was also comparatively without them: but every intermediate part of the sky, between the horizon and the central space, seemed equally filled with the glancing lights. Their course was always in straight lines, but the fainty traced light which often remained after the brilliant flash was extinguished, sometimes became crooked. The lights were generally mere streaks, equal in size and brilliancy throughout their extent; and their most luminous duration,

was generally for a very short time. But a faint mark of the tracks often remained visible for some time after. Their apparent length varied from five or six diameters of the full moon at its rising, to perhaps one fifth the visible arch of the sky. But I repeat that these estimates must be far from accurate. Sometimes a flashing and far more brilliant burst of light, like the explosion of a rocket, would take place during the course of the longer streams. In these cases, the resemblance was striking between these lights and so many sky rockets, if the latter could be supposed to fly downward, and always in straight lines. I mentioned that a faint line of light would sometimes remain awhile, to mark the course of the more brilliant track of the meteor. The most remarkable effect of this kind observed was this:—A long stream in the south was accompanied by one of the strongest bursts or explosions of light, and left a faint line, which from straight, gradually became crooked, first with two angular bends, and finally assumed the form of the letter S, very distinctly, though irregularly traced. A friend whom I had called up, was dressing when the flash took place, and which, though not visible through his windows, was very perceptible to him by the general illumination it diffused through the apartment. When he joined me in the yard, the figure of the S was still visible to us both, and our different suppositions of the lapse of time between the bright explosion, and the last distinct remains of its train, agreed in making it to be not less than two minutes. I thought it longer. No sound was heard of any kind. The lights disappeared gradually with the stars, and apparently from the same cause, the approaching light of the sun. Of course this would first conceal entirely the smallest, and lessen the appearance of the greatest, until none would remain visible. Therefore, there is no reason to think that the meteors ceased to be produced, when they ceased to be visible. If I can rely on the reports made by some of my negroes, this beautiful scene had been observed for some hours before I knew of it—and indeed, one says, that he saw its commencement before he went to sleep, perhaps before midnight.

I have never before had a good view of even a single shooting star, though my eye has often caught an indistinct glimpse of their lines of light. In this case, in half an hour, I must have seen several thousands: and by looking towards any point in the heavens for a very short time, one at least, would be seen to start into existence, rush through its course, and vanish.

These lights were nothing in appearance like lightning, except in the flashes or explosions. Bright as they were, they seemed of a white or silver splendor, like that of the moon, rather than the glaring yellow of the sun. It was a clear star lit morning. The weather had been very warm the previous day, with appearance of rain—but a brisk west wind had cleared away the clouds, and cooled the temperature. The earth was but slightly frozen in the places most exposed to cold this morning. The wind was from the west at sunrise, but was not noticed earlier in the morning.

E. R.

FARMERS AND MECHANICS.

From the Portland Gazette.

An opinion both dangerous and pernicious to the farmers and mechanics of our country is prevailing among the majority of them. They imagine that literature, science, and general information are unnecessary to them; and that if they are acquainted with the commonest rules of arithmetic, reading, writing, and the trade to which they are called, they have all the acquirements their business demands. What have we to do, say they, with polite literature and history, with the deeper branches of mathematics, the art of composition, eloquence, &c. They have nothing to do with our profession, we are to get our bread by the sweat of the brow; and we leave these branches of education to the ministers, the doctors and lawyers of the land.

Now as long as sentiments like these prevail among mechanics and the laboring classes of the community, so long will they be doomed to an intellectual and political slavery of the better educated classes; so long they are doomed to be stripped of their power, and to be ridden by ambitious and designing men. When they are really convinced that knowledge is power, and that the educated part of society gives laws to the rest, they will wake from the stupor, and bestir themselves to get this power into their own hands. It is not the wealthy that rule in our legislative councils, in politics, in town meetings, and every day concerns of life; it is not the aristocratic part of the community that have sway over the rest; but it is the educated, the active, the intelligent, who are the emperors and kings of our country, men of superior intelligence, who feel the power within them, and who exert it to sway the rest.

As matters are now arranged in our country, the lawyers are the only men of whom we have to complain; they get into all the seats of power—give laws to the community, and then set about executing them; they are invested with both the legislative and executive power, the abilities to make what laws they please; and the power to execute them as they please; they frame our laws, sit in our councils, are our judges, our presidents, our governors, our selectmen, our overseers; they creep into every seat of power; from the lowest grade, till they reach the last goal of their ambition in the highest office in the gift of the people. The question now arises, from what source do they derive this immense power? Is it from the superior talents of the profession, from the superior worth, or superior wealth? We think not. This profession is undoubtedly the most intelligent portion of the community; and to this source may be traced all its influence over society in general. Divines and physicians are equally intelligent; but their avocations do not lead them to mingle so much in the business, the uproar, and the excitement of the world, and as they are less active, they consequently have less influence. Lawyers are not only the most intelligent part of the community, who mingle in the affairs of the world, but they are far the most active—they exert themselves the most in order to obtain the most influence.

Farmers might have this power; yea, much more, for the feelings of the majority of the world are on their side; they have an interest too, in propping up themselves, in building up their own

profession, and now if they had the information to direct their energies aright, they would have within themselves an irresistible influence over the destinies of others. Farmers, &c. do not hold that rank in society, they might hold if they please, which they are intitled to hold by the good they do to mankind. But make every man feel the deep necessity of cultivating his mind, and drawing out his hidden treasures; make him feel that his mental powers over society, as in fact it does, depends upon the quantity of information he acquires; let him believe that tact, and skill, and a knowledge of the human character, are as necessary to him as a knowledge of his tools, and you give that man his due proportion of influence with the world.

But we are stopped at once and told by him, that he has no leisure to cultivate his intellect; his every day vocations demand all his attention and time. Every man, even the busiest, the most industrious, has leisure enough, if he is disposed to spend that leisure as he ought, instead of whiling it away in trifling and idleness. Put these questions to yourselves, and see if you have no leisure. How many evenings do you spend in idleness, in laughing, in useless talk, in beating the streets? How many more hours are devoted to sleep than is necessary for your health? It is a fanciful idea that people have, when they say that education cannot be obtained without money and teachers.

The idea about the want of time is a mere phantom. Franklin found time in the midst of all his labors to dive into the hidden recesses of philosophy, and to explore an untrodden path of science. The great Frederick with an empire at his direction in the midst of war, and on the eve of battles which were to decide the fate of his kingdom, found time to revel in all the charms of philosophy, and of intellectual pleasures,—Bonaparte, with all Europe at his disposal, with kings in his antechamber, begging for vacant thrones, with thousands of men whose destines were suspended on the brittle thread of his arbitrary pleasure, had time to converse with books. Let laboring men then make use of the hours at their disposal. They are the life blood of the community; they can, if they please, hold in their hands the destinies of our republic: they are numerous, and respectable, and powerful; they have only to be educated half as well as other professions, to form laws for the nation.

WATER USED TO PRODUCE HEAT AND LIGHT.

[Annunciations of the curious and, perhaps, important discovery in the arts which will be stated below, have been made in both England and America so nearly at one time, as to leave in doubt who has the best claim to the priority of invention. Without expressing any opinion on this head, (for which it will be early enough when the value of the discovery is fully established by experience), we present the first notices that have reached us from both sides.]

Correspondence of the Journal of Commerce.

London, Aug. 14th, 1833.

I cannot refrain from here calling your attention to a most important discovery, one which, if it realizes the anticipations of the inventor, must remove the only obstacle to the triumph of steam navigation. This is a new mode of producing heat, by which both wood and coal are to be superseded. I find the account in a *Salisbury* paper, and if it had not such an appearance of honesty, I should doubt its reality. It is as follows:—"The principal ingredient is water. The only material required besides, is something in a liquid form, which contains a large quantity of carbon: whale oil, tar, or almost any thing of a similar kind will answer the purpose. As these materials are put into the furnace simultaneously, and in combination with each other, the one yields its carbon, while the other gives out its hydrogen, and a small portion of atmospheric air is the only thing then required to keep them in a state of perfect combustion. The whiteness and intensity of the flame can hardly be imagined by any one who has not seen it, and yet it is so completely under management, that in one second it can be reduced or augmented as occasion may require." The account then states that from the absence of all smoke, chimneys can be got rid of, and that a vessel may *without inconvenience* carry enough fuel to enable her to circumnavigate the globe. The statement is in such a creditable shape, and put forth upon the faith of the editor as a leader, that it is impossible not to rely upon its correctness. The editor also states, that at the Gas Works ar Lymington it has been in successful operation during the last *three months*.

From Silliman's Journal of Science and Arts.

TO PROFESSOR SILLIMAN.

Dear Sir,—It is now more than twenty years since I have been in the constant, I may say daily practice of making experiments on the decomposition of water, by mixing with its vapor that of spirits of turpentine, and a great proportion of atmospheric air. In its decomposition by explosion, the object was to obtain, for mechanical purposes, a new and first moving power that should be perfectly safe, and altogether lighter and cheaper than that from steam. With a much less proportion of air, the object was to furnish a steady and pleasant flame like that from oil or gas: in both of which objects I have succeeded.

The evidence I often observed in the effect of water in combustion, made it very certain in my mind that it would be of immense benefit to the community if it could be effected in a way that would be regular, simple, and free from difficulties. It was this, together with an unconquerable inclination and determination to follow it through life, if I did not succeed short of it, which made me persevere for so great a length of time. This resolution was, perhaps, imprudent; it certainly would have been so had I not supposed I had the means within my own reach. I have no doubt that I have tried lamps, stoves, and machines in more than four thousand different forms, for effecting these purposes, and yet not many months have elapsed since I have felt entirely satisfied.

The experiments which I have made, have proved practically, that an engine with a power equal to driving a boat four miles per hour, and a rail road car twice that distance in the same time, with ten or twelve passengers, may be made for one hundred dollars; and that the engine, with its preparing vessel, (a substitute for the boiler in the

steam engine,) need not weigh one hundred pounds, and the expense of working it will not exceed ten or twelve cents per hour. There are certainly no difficulties to be removed. These facts have been verified practically and repeatedly before hundreds of people.

Some recent improvements in the mode of constructing lamps for burning water to produce light and heat, have perfected the operation for these purposes. It now carries demonstration in every form. For instance, when you put but one-fourth of a gill of spirits of turpentine into the lamp, and as much water, and raise the temperature to less than that of boiling water, the vapor that comes over will be in the ratio of about equal parts of each; if, in the combustion of those vapors, a due proportion of air is mixed and inflamed, it will in a few minutes boil a two-quart copper tea-kettle; if small brass wire is brought over and in contact with the flame, it instantly drops in pieces; small copper wire is readily melted: fine iron wire, if the proportions be right, is instantly inflamed; and thin sheet copper with a small piece of silver or silver solder on it with borax, being exposed to the flame, the silver melts in a few seconds, and the copper very soon; and this is done while the vapor is not concentrated in any way, and issues only with a velocity about the same as that of gas in gas lights.

This discovery gives every promise of supplying much cheaper fuel, (as a fuel,) exclusive of a clear saving of light than any now in use. It is my intention to introduce my lamps, &c. into use as soon as I conveniently can. This must be postponed until I can again leave home, which I trust will be early in the ensuing summer.

Oxford, April 14th, 1833.

REMARKS.—We have seen some of Mr. Morey's experiments, and can testify to the correctness of his statements, as regards the great amount of heat and light evolved by combustion of the vapor of water mixed with that of spirits of turpentine or alcohol, and duly modified by common air. The results are very striking and beautiful, and we can see no reason why they should not prove of great practical utility.—*Editor.*

EXTRACT FROM AN ADDRESS

Delivered before the Rockbridge Agricultural Society, at their Show and Fair at Fancy Hill, on the 16th October, by Doct. ROBERT R. BARTON, President.

The task of finding fault and detecting error, is an invidious one, but much easier than the application of the appropriate remedy. But I hope you will always find me ready to render my feeble aid towards correcting as well as pointing out the defects of our system. In the first place then, I will remark, we all cultivate *two much land*. Half the quantity, well managed, and cultivated on the Pennsylvania or New England system, would yield us double the product, whilst the balance of our farms might be set in clover and other grasses, and be improving even under *pasture*. From forty acres of wheat land, a northern farmer will generally expect one thousand bushels, or at the rate of twenty-five bushels an acre.* Yet there is not one of us who averages the half of this, with a soil equally good, naturally, with only a little difference in climate in their favor. But even in corn, to which our climate is decidedly more congenial, they can and do excel us. I am willing to allow them some advantage in having white labor to work their lands; but still the difference is too much against us, and as we cannot substitute the white for the species of labor, which is certainly the bane of agriculture and the general prosperity of our country, yet we can bestow the same labor on *half* the quantity we now cultivate. When we compare the difference in the profits of agriculture, both in Europe and amongst our brethren of the north, with those of the southern and middle states, our ambition will be roused and a determination excited, both for the sake of patriotism and individual interest, to imitate the good example they have set us.

In England, we are told, the annual produce of their lands is often worth from $30 to $40 per acre, and rent annually for a sum sufficient to purchase three or four acres in our country. But there, when a farmer lays out $10,000 in the purchase of land, he always expends several thousand dollars in the purchase of lime, marl, &c., which cost them about double what the cost with us would be. (And here I would remark, that large beds of shell marl abound in this county, in the neigbborhood of Mr. Weaver's forge, Mr. Baggs', and Mr. Pogue's, which, if hauled to the clay hills, would richly reward them for their labor.) Capital is considered as indispensable to the English farmer, as it is here to the merchant; and they always expect their profits to be in the ratio of the capital expended in improvements, yielding them generally from 10 to 15 per cent. In Italy, where their farms are still smaller than in England, averaging from five to ten acres, tenants can afford, and do pay to their landlords, one-half of the the products of the soil. And in Flanders, where, perhaps, agriculture has been carried to as high a state of perfection as in any other part of the world, the quantity produced per acre would be considered incredible.

To what then is this difference ascribable? It cannot fairly be attributed to climate, or to soil, for in both, nature has been bountiful to us; and however mortifying it may be, we must admit it is mainly owing to our wretched system. We must cultivate less, and cultivate better. Plough deep, that our crop may not be drowned in wet seasons, and that there may be a receptacle for moisture, when too dry. If your soil be too stiff, lime it, or use marl, or plough and expose it to the action of the winter's frost; or what, perhaps, will mellow it still more effectually, turn under a green crop of clover. By one mode, you have it prepared for your spring crop of corn, or oats, and in the other it is exactly in the right state for a crop of wheat, which is nourished and supported through winter, by the fermentation and decomposition of the clover. If too loose and permeable to the action of the sun, deep ploughing and lime are still the appropriate remedies. Our loose lands have generally a substratum of clay, and by deep ploughing, sufficient tenacity is readily given to the surface soil. If too sandy, a few loads of clay is the best manure, and will soon correct the evil; and we all know a union of sand and clay will form that stiff soil called mortar.

But I have not touched on a subject, perhaps of

*This is on a clover lay.

the greatest importance to the farmer. I mean the alternation, or as it is more familiarly called, the rotation of crops. From the want of due attention to the regular succession of our crops, much labor is lost, and our fondest hopes frequently blasted; and there cannot be a more convincing evidence of bad farming, than the growing of two successive crops of the same kind on the same ground. Wheat may succeed after wheat, and corn after corn; but this does not prove it to be right. It merely proves how bountiful Providence has been, to supply us with a soil which will stand so murderous a system. I know not that it matters much whether corn be followed by wheat or oats, provided it be planted on a clover lay, or an abundant supply of manure ploughed in, until our fields are better set with clover. But one or the other is indispensable to insure the succeeding crop, and the steady improvement of the land. We may, then, follow corn with oats, that with wheat, and lastly, with rye, sown the last week in August, or first week in September, with clover, or what is better, with clover and timothy mixed. A crop of clover is then succeeded by four grain crops; and this advantage may arise from oats, instead of wheat after corn, that more *time* is allowed to us. We are sometimes compelled to cut our corn too soon, or to postpone the wheat crop too late. The chief danger, I apprehend, would be, that not being under the necessity to cut up our corn, it would be neglected, and much valuable provender lost, and without which the barn-yard cannot be properly supplied with manure. One of the evils of wheat after oats arising from the volunteer growth of the latter, may be avoided by pasturing hogs and other stock, immediately after harvest, harrowing it soon after, and then giving it a deep ploughing about the middle of September just before sowing the wheat. In this way, what is left by the stock is buried beyond the reach of vegetation. But we raise too much corn and too little wheat. We ought therefore to divide our farms into seven or eight fields, so that we could select one of the poorest every year, which had been laying three years in clover, to fallow up in September, and harrow in wheat.* And by fallowing this again with rye, the clover seed of the previous crop would be brought to the surface, and the labor and expense of sowing be avoided. This system differs widely from the four-field shift system of Mr. Carter of Shirley, to whose valuable communication on the subject of the rotation pursued by him, I would beg leave to call your attention. You will find it in the 3d No. of the Farmer's Register, an agricultural periodical, ably edited by Mr. Ruffin, author of a work on calcareous manures, that ought to be read and studied by all of us—and I am sure I could not do you a better service than by inducing you to take the Register above alluded to, or any other ably conducted paper on agriculture. Reading of this kind will excite observation and inquiry—will elicit new ideas on this subject, and as we are now half a century in the rear of agricultural improvement in other parts of the world, enable us with rapid strides to take that station to which our general intelligence, and the fertility of our soils, entitle us.

I will detain you a little longer on the subject of grasses. These have been too much neglected by us all. Our rich soil, if not better employed, will throw up rank and noxious weeds, and though under the system recommended, every field will be constantly in clover, or in grain, yet occasionally there will be a partial failure of the former; and we ought to mix some other grass. Timothy answers the purpose better with me, than any other I have tried. I am confident I have added a fourth, perhaps a third to the quantity of my hay, by this admixture. It seems to support and sustain the clover, and, if we cannot get through our mowing before harvest, it shades it, and still enables us to turn a heavy swath after we have disposed of our wheat. For pasture, the advantages will at once strike you all. Moreover, I conceive the timothy a clear gain, as it does not seem to interfere with the clover, and only occupies the place of weeds, or less valuable grass, particularly the third season. The soil requires a change of grass, as well as grain, and affords nutriment peculiarly adapted to each variety. And here, as in most other instances, nature indicates the proper course. Most of us, no doubt, have observed the regular succession of weeds and plants, in our fields, left to a state of nature. It is even said, the common mushroom will not grow two successive years in the same ground. Let us profit, then, by the hint, both in our grain and in our grasses. I have, however omitted to mention what I esteem, and it is so esteemed both in Pennsylvania and Maryland, a valuable grass; I mean the orchard grass. I would not recommend it in our fields which are to undergo a regular rotation; because it will improve for ten or a dozen years, and it grows in such tufts as to render the ground difficult to be ploughed. But for lots, and all who have not them, ought to have three or four convenient to their barnyards, for soiling until the pastures get a fair start in the spring, it is an invaluable grass, both for late and early calves and colts; it grows equally as well under the shade, as in exposed situations; and is extremely well adapted to orchards, if any grass is admissible there, and to groves of every description. It would be well adapted to groves of locusts; and I am glad to see your attention has been called to the rearing of this valuable species of timber, by one of the worthy members of this society. Some of us, too, have small spots of ground too wet and marshy for cultivation, and these are peculiarly adapted to what is called herds grass,* or red top. But it is said, there are upwards of 200 grasses, and surely out of this number we can find some adapted to every variety of soil, and probably no country can boast of such a variety as Rockbridge. But, gentlemen, a new spur must be given to agriculture, before we can profit much by the natural advantages we possess, and which have been most bountifully lavished on us. We must emulate the north, particularly New York, where an agricultural society is supported in almost every county, diffusing intelligence, and consequently wealth, into every corner; for in nothing else is that axiom more correct, that "knowledge is power," and without it the farmer is fre-

* In a country abounding, as ours does, with fine rail timber, the labor would be counterbalanced by the many advantages arising from 7 or 8 distinct enclosures.

* Timothy, in New England, is frequently improperly called herds grass.

quently dropping in the dark. It enables him, with but little labor and expense, frequently to accomplish what might otherwise present insurmountable difficulties. It was before observed, we must, like the industrious bee, pick and cull from every source, and bring to the general store. What would be impossible for any of us to effect, will be easy, by associating together and exchanging views and comparing the experience of each. But the utility of agricultural societies is too obvious to require further elucidation. Physicians, more jealous of each other than any other class, associate together for mutual improvement, and to advance the interest of all. So of lawyers, the clergy, mechanics and all. And is it not more incumbent on us in whose prosperity all are so deeply interested? The farmer is certainly the most important link in the chain which binds society together. When his interest droops, all must sympathise, and all must be depressed; and when he is prosperous, life and animation is imparted to the whole community. The statesman, the warrior, and the professional man, all long for the happiness and innocent pleasures of rural life. In ancient times, Cincinnatus exchanged his sword for the ploughshare and pruning hook; and our beloved Washington, great, both in the cabinet and in the field, most gladly retired to the peaceful and quiet pursuits of his farm.

But after all, what avails it, that we have a fine climate and fertile soil, intersected with two noble streams, and abounding as it does with much mineral wealth, if half our produce is consumed, to get the other half to market? While we turn our attention to a more judicious system of crops, we must keep an eye steadily fixed on the improvement of the great thoroughfare nature has given us to market. Who would hesitate to give a portion of his profits to its improvement, when both patriotism and individual interest so loudly call for it? Such an improvement as is contemplated by the character of the James river and Kanawha Company, most liberally granted by our legislature: would soon reduce the freight to less than one-half it now costs us, and a new source of wealth would soon be opened to us in the quarries of limestone and marble,* found so abundantly through our county. It is a fact which, perhaps, you are not all apprised of, that Richmond is almost entirely supplied with lime from New England, and often at a cost of fifty cents per bushel; while the cost of it here would not exceed three or four cents. But besides, we abound in iron, and it is not improbable, in copper and lead;† and judging from the formation of our country, I would expect to find stone coal, and, perhaps, salt and gypsum. The last is indispensable to the raising of clover, and if not found amongst us, must still be brought from Richmond at an expense of about $20 per ton, until our rivers are improved.

* Large quantities of pink, blue and gray marble, are found in the neighborhood of Mr. Doniho's Forge, and on several farms in the southern part of the county.

† Both are found in several situations on the Blue Ridge, more particularly in the neighborhood of Thornton's Gap.

THE CULTIVATION OF TOBACCO NOT OPPOSED TO THE IMPROVEMENT OF LAND.

To the Editor of the Farmers' Register.

Amelia, Nov. 7th, 1833.

I shall offer no apology for affording some small aid to your labors, in the shape of a few observations on the culture of tobacco, &c.

The part of Virginia in which I live and where all my interest lies, has been, and for a long time to come *must* be, a tobacco growing country. This *we* well know, and must lament, (if, as has been so often of late asserted) the culture of tobacco be incompatible with the proper care of the soil. But is this the fact? I will attempt to show, (not from any theoretical reasoning, but from some plain matters of fact,) "that it is *very practicable* to grow large and *fine* crops of tobacco without the aid of a load of manure, or the cultivation of a foot of new land; and I think it will follow as a matter of course that the farm may be improved *almost* as much with the tobacco as without it.

Mr. William Old, of Powhatan, has, for the last ten or twelve years, made as large crops of tobacco, (I mean for the quantity cultivated,) as any man in the state,—never or very rarely less than 1000 lbs. to the acre—sometimes a great deal more; and this too always commanding a high (relative) price. He has two lots for tobacco, one of which is planted every year, followed the next spring with oats, which, when ripe, are rolled down, or turned under with the plough, as he thinks best. This crop of oats not only supplies as much fertility as the tobacco may have exhausted, but the lots are becoming richer every year. On these lots he uses no manure; that is reserved for his corn and wheat. The cost of the seed oats is about fifty cents the acre. The labor of sowing and afterwards rolling down is very trifling—not equal to the expense of carting the manure on the lot if it was given to him. What I would principally call your attention to, is the fact:—That the general character of his farm has been more improved in the last ten years (whether you regard its appearance or its product,) than any other farm, save my friend Wm. Finney's, within my knowledge—during the whole of which time he has cultivated tobacco successfully. Nor are there any peculiar circumstances of a favorable character which apply to his farm and situation, more than to others. On the contrary, his predecessors were literally unable to support their families on the farm which he has thus improved. These are the facts on which I rely to prove the position, viz. That the culture of tobacco is not incompatible with the improvement of the land; and I think they will be allowed fully to sustain it by all who will take the trouble to inspect Mr. Old's estate.

I do not know whether the above is to subserve any other useful purpose than to fill a column in the Register,—for the spirit of *radicalism* is so predominant in these days, that *amelioration* is deemed worthless. Revolution is the remedy for every evil. Thus if you would succeed in agriculture, get rid of *slave labor* and *tobacco*. If a law oppresses you, (really or in imagination,) nullify it. If your legislature vexes you with its long and useless sessions, call a convention. This is the order of the day; and under these impressions, thousands are yearly abandoning their native state who, did they but view the matter correctly, would

see that half the energy and industry they are obliged to exert in removing and fixing themselves in the west, if applied to their farms at home, would secure to them a good income and an improving capital.

I am respectfully yours, H. MEADE.

P. S. Mr. Old has, within the last year, added another tobacco lot, (for reasons connected with the general arrangement of his farm,) but still uses no manure for tobacco. I had for several years past cultivated two lots in tobacco and wheat alternately, in the hope that a crop of peas sown on the stubble immediately after harvest would keep up the fertility of the lots. But the difficulty of getting the peas sown in time has forced me to abandon the system which otherwise I have no doubt (on land lying well, and made rich at first,) would be a very good one.

H. M.

THE PEEWEE.

From the Genesee Farmer.

None of our feathered songsters are more inclined to become domestic that the Peewee (*Muscicapa fuscow.*) When not disturbed, they soon become unsuspicious of evil designs; and take up their lodgings on the outside of the house without caring who lodges within. This summer one has chosen to *roost* on the limb of a tree about two feet from our chamber window. He must often see us moving about within; but his business is to catch the flies without; and he has performed this service greatly to our comfort and satisfaction. With the nature of glass, however, he is not yet fully acquainted; and seeing flies on the inside, he often raps against it with his bill to no purpose. Since the brooding season is over, his mate also comes round; and late as it now is in the season (the 18th Oct.) and cool as the weather has become, they seem to feel very much at their ease; and in looking at them through the glass where they sit at the distance of five feet from me, I perceive nothing that would indicate their prospect of shortly journeying to Carolina.

It has been said that they eat bees; and many of their race have been destroyed in consequence of this suspicion. I should be very unwilling to lose *mine* on such an idle charge. They are really useful birds; and I shall feel a sense of lonesomeness when they take their departure. When we undertake to kill birds, we ought to know for what; and we should remember that in charges against them as in other cases there are two sides to a story.

EARL STIMSON'S FARM.

From Stuart's Three Years in America.

On the 18th of November, made an excursion to the township of Galway, with a view to see Mr. Stimson's farm, about eleven miles from Ballston Spa. Mr. Stimson is a very enterprising person, has an extensive farm, a large hotel, and great stores as a merchant. We are told that there is no farm within our reach at present so well entitled to notice. Mr. Burtis, our Saratoga charioteer, carried us to it. We were unlucky in not finding Mr. Stimson at home, but Mrs. Stimson was extremely communicative and obliging, more especially considering that we had no introduction to her.

The situation of the farm is very elevated, with the highway running through it. Of 800 acres, of which the farm consists, Mr. Stimson has about one half in cultivation. His fences, horses, farm-houses and the whole establishment, are good and in good order; and there is an appearance of activity and attention about the place that would do credit to the agriculturist of any country.

The whole land has been improved by Mr. Stimson: it is laid off in fields of about eight acres, enclosed with stones gathered from the land in the lower part of the fence, and a frame of wood on the top of them. There are two rails above the stone, and about twenty miles of this sort of fence.

The soil is generally light, but Mr. Stimson manures, though perhaps not so much as might here be done with advantage, yet a great deal more than most farmers in this country, and of course raises better crops. His general rotation is, 1. Maize or Indian corn, with patches of potatoes or turnips on the edges of the field; 2. Barley, or sometimes oats; 3. Wheat, in which he sows five pounds clover seed, and two quarts timothy per acre. Then he cuts the timothy for two years and pastures for one. He breaks up the pasture for wheat, then takes a crop of maize and follows the above rotation, manuring either on breaking up or with the maize. Land is less overrun with weeds here than in Britain, and for some time after being cleared, much richer in point of soil. In this view, the rotation by which crops of grain are taken consecutively may admit of justification to some extent. Yet I cannot but suspect that the return would, on the whole, be greater, if the manure was always applied to the maize or green crop, followed by only one grain crop of wheat, or oats, or barley with which grass seeds are sown. The land would thus constantly be clean, and in good tilth, and the lesser number of grain crops would be compensated by their superior quality.

Mr. Stimson has reported his produce from 85 acres to be what follows, after actual survey and examination; and while he can obtain such a return, he is well entitled to adhere to his own system.

10	acres of orchard ground	produced	25 tons hay.
8	do. Maize,	560	bushels.
8	do. do.	720	do.
10	do. do.	300	do. and 16t. hay.
4	do. Wheat,	140	do.
1	do. Flax,	600	lbs.
8	do. Oats,	560	bushels.
8	do. Hay,	32	tons.
8	do. do.	36	do.
1	do. Barley,	60	bushels.
3	do. Hay,	10½	tons.
4	do. do.	12	do.
8	do. do.	24	do.
2	do. do.	1000	bush. potatoes.
2	do. in vegetables raised	400	chickens.

Mr. Stimson has gained almost all the agricultural premiums in the county; for having the best managed farm; for having raised 62 bushels of barley on an acre; for having raised 357 bushels of potatoes on half an acre; and for having raised five tons of timothy hay per acre.

The field of maize on this farm, when well hoed

and cleaned by the plough, cannot fail in summer to give a very gay appearance to the field, even superior to that of the best dressed green crops to which the eye of a British farmer is accustomed; but at this season, the want of those green crops of turnips, mangel wurtzel, ruta baga, &c. which, as well as potatoes, are only raised in small portions in the margins of the fields, creates a great blank. The maize is the great article used, not merely as the cleaning crop, but for feeding horses, cattle, and poultry, for which it is admirably adapted.

When we returned from the fields we found a very nice dinner prepared for us, and a bottle of wine on the table. Mrs. Stimson had previously dined, but gave us the pleasure of her company; and was, I believe, not less inquisitive in putting questions to us respecting land management in Scotland, than we respecting that in this neighborhood.

On coming away, we found that there was no bill to pay for ourselves, Mr. Burtis, or horses. Mrs. Stimson could make no charge on strangers who had paid her a visit, in order to see the farm; she only regretted that we could not stay some days with them. We find all the farmers in this part of the country, whom we meet in our pretty extensive perambulations, communicative and well informed on the subject of their management, perfectly aware of the importance of fallows and green crops, but generally of opinion that they dare not attempt that system, on account of the high price of labor in this country in relation to the value of land, *ne sumptus fractum superet*, according to the sound advice of Varro. The price of labor too, is the great obstacle to all sorts of ornamental improvement, such as the formation of gardens, and keeping them up. Making, therefore, the necessary allowance for change of circumstances and situation, there does not seem to be any ground for charging the American agriculturist with want of knowledge, or of activity and enterprise.

A PARASITE OF THE HONEY BEE.

(Apis Mellifica.)

From the Journal of Science.

For a few years past, many of those people in this vicinity, who have apiaries, have found that in the months of April, May and June, an unusual mortality had prevailed among their bees. This circumstance has led to a thorough investigation of the cause by those who have felt a particular interest in the products of this valuable insect; and the result has proved that this mortality has been produced entirely by a parasite.

More than two years since one of my neighbors suggested to me his conjecture, that there was a parasite fly that was injurious to the honey bee: since which time we have fully ascertained the fact. I have a box now before me containing a great number of bees, in which may be found the parasites, in both the pupa and the perfect state. Usually the bees become sickly and unable to fly, when the parasites are in the larva state; but they sometimes live till the perfect insect emerges from the pupa. The larva is fixed at the inosculations of the dorsal segments of the abdomen of the bee, and is hardly discoverable by the eye unless the abdomen be dissected. The larva is white, nearly two lines in length, and very much resembles a small worm or maggot. The pupa is nearly the size of the larva, and of a reddish brown color. The perfect insect is a nondescript, and bears very little resemblance to the [*Stylops*] or [*Xenos*] or any other insect, that has been found to be a parasite of the bee or wasp. It is of the class Diptera of Lin., is little larger than the Hessian fly, but in color and form it is very unlike that insect.

Kirby, many years since, discovered that the insect (*Stylops*) was a parasite in the black-bronze bee, (*Andrena nigroænea*,) in England, and Professor Peck afterwards found that the (*Xenos*) was a parasite in wasps, in America; but I am not aware that a parasite of the honey bee has ever been discovered till of late, and in this vicinity.

In conclusion, I would most sincerely request those who have apiaries to examine their hives during the spring and summer months, and if this parasite is discovered, to investigate the history of the insect, and if possible, to find a remedy for the injury it may produce.

MARTIN FIELD.

Fayetteville, Vermont, May 15, 1833.

MULBERRY.

From the Northern Farmer.

I wish to communicate a fact in relation to the propagation of the white mulberry, which I think is worthy of notice. During the season of feeding the silk worm, I trimmed my trees very liberally, yet I found it necessary in August to give them a second pruning. The branches separated were of *this season's growth*, and by way of experiment they were placed in the ground in the usual manner of setting out cuttings. In a short time the buds began to open, and have now sent forth branches from half an inch to two inches in length, containing from two to six leaves each. If the season is favorable, they will not only form buds for the next year's wood, but gain sufficient firmness to endure the winter. Would it not be the most economical and expeditious mode of increasing a mulberry orchard, to pursue this course. Raising trees from the seed is frequently precarious; and if cuttings set in the *spring* will grow to the height of twenty or thirty inches, they will, by getting a start in the *fall*, far exceed the second year's growth from the seed, which surely reaches four feet. "Cut and try."

SPLITTING ROCKS BY LIGHTNING.

From the Bunker Hill Aurora.

The first experiment of splitting rocks by means of electric fluid, was made in Prussia, in 1811. The process was very simple—into a hole in the centre of the rock is placed a long rod of iron, as a conductor, terminating in a point. When a thunder cloud passes over the stone, within its striking distance of the earth, the lightning from the cloud strikes the upper part of the conductor, and is conducted downwards to the heart of the stone, which either rends it in different places or splits it at once into a multitude of fragments. The experiment in Prussia was attended with complete success, during the first storm that passed over after the conductor was inserted in the stone.

NEW COTTON FACTORY IN RICHMOND.

From the Richmond Whig.

Mr. P. J. Chevallie gave notice, the day before yesterday, that he would on that day open a subscription for a thousand shares of stock of $100 each, to erect a cotton manufactory on his property near the immense flour mill he is now building at the foot of the basin, in the centre of the city. The first day about two thirds of the amount was subscribed, and the balance was taken yesterday.

THE SUGAR CROP.

The New Orleans papers state that the early frosts have done much damage to the sugar cane; in many places half the quantity of sugar which had previously been calculated upon will not be made. On one estate alone, it is estimated that the frost had caused a loss of three hundred hogsheads. The injury to the cotton crops was represented to be inconsiderable.

EFFECT OF A RAIL ROAD ON THE VALUE OF PROPERTY.

From the Petersburg Intelligencer.

The lot of ground on Bollingbrook street, upon which the Columbian Hotel formerly stood, was sold a few days ago at public auction, for the sum of $6,300. Two years ago it could not have commanded half that sum. Subsequent sales of real estate have been made at equally advanced rates. We mention these facts as evidences of the increasing prosperity of our town.

EXTRACTS FROM JESSE'S "GLEANINGS IN NATURAL HISTORY."

Bees—Language of Insects.

My bees are a constant source of amusement to me; and the more I study them, the more I am led to admire their wonderful instinct and sagacity. Few things, however, surprise me more than the power which they possess of communicating what I can only call 'intelligence' to each other. This I observe to be almost invariably the case before they swarm. Some scouts may then be observed to leave the hive, and for some time to hover round a particular bush or branch of a tree, after which they return to the hive. In a little while the new swarm quits it, and settles on the branch which had been previously fixed upon by the scouts. The same power of communication may be observed in the ant. I have often put a small green caterpillar near an ant's nest; you may see it immediately seized by one of the ants, who, after several ineffectual efforts to drag it to its nest, will quit it, go up to another ant, and they will appear to hold a conversation together by means of their antennæ, after which they will return together to the caterpillar, and, by their united efforts, drag it where they wish to deposite it.

I have also frequently observed two ants meeting on their path across a gravel-walk, one going from, and the other returning to the nest. They will stop, touch each other's antennæ, and appear to hold a conversation; and I could almost fancy that one was communicating to the other the best place for foraging, which Dr. Franklin thought they have the power of doing, from the following circumstance. Upon discovering a number of ants regaling themselves with some treacle in one of his cupboards, he put them to the rout, and then suspended the pot of treacle by a string from the ceiling. He imagined that he had put the whole army to flight, but was surprised to see a single ant quit the pot, climb up the string, cross the ceiling, and regain its nest. In less than half an hour several of its companions sallied forth, traversed the ceiling, and reached the depository, which they constantly revisited until the treacle was consumed.

Huber says, "that nature has given to ants a language of communication by the contact of their antennæ; and that, with these organs, they are enabled to render mutual assistance in their labors and in their dangers; discover again their route when they have lost it, and make each other acquainted with their necessities. We see then," he adds, "that insects which live in society are in possession of a language; and in consequence of enjoying a language in common with us, although of an inferior degree, have they not greater importance in our eyes, and do they not embellish the very spectacle of the universe?"

What I have said respecting the power of communicating intelligence to each other possessed by bees and ants, applies also to wasps. If a single wasp discovers a deposite of honey or other food, he will return to his nest and impart the good news to his companions, who will sally forth in great numbers to partake of the fare which has been discovered for them. It is therefore, I think, sufficiently clear that these insects have what Huber calls an antennal language—a language we can have no doubt, that is perfectly suited to them—adding, we know not how much, to their happiness and enjoyments, and furnishing another proof that there is a God—almighty, all-wise, and all-good—who has 'ornamented the universe' with so many objects of delightful contemplation, that we may see him in all his works, and learn, not only to fear him for his power, but to love him for the care which he takes of us, and of all his created beings.

Anecdotes of Bees.

A large brown slug made its way into a glass hive, where the operations of the bees could be distinctly seen. Having killed the slug, and finding that they were unable to get it out of the hive, they covered it over with the thick resinous substance called propolis, and thus prevented its becoming a nuisance to the colony. Into the same hive one of the common brown-shelled snails also gained admittance. Instead of imbedding it in propolis, the bees contented themselves with fixing it to the bottom of the hive by plastering the edge with that substance.

I have now in my possession a regular fortification made of propolis, which one of my stocks of bees placed at the entrance of their hive, to enable them the better to protect themselves from the attacks of wasps. By means of this fortification, a few bees could effectually guard the entrance, by lessening the space of admission, which I had neglected to do for them.

Bees show great ingenuity in obviating the inconvenience they experience from the slipperiness of glass, and certainly beyond what we can conceive that mere instinct would enable them to do. I am in the habit of putting small glass globes on the top of my straw hives, for the purpose of having

them filled with honey; and I have invariably found that before the bees commence the construction of combs, they place a great number of spots of wax at regular distances from each other, which serve as so many footstools, on the slippery glass, each bee resting on one of these with its middle pair of legs, while the fore-claws were hooked with the hind ones of the next above, thus forming a ladder, by means of which the workers were enabled to reach the top, and begin to make their combs there. I was glad to find this circumstance recorded in Dr. Bevan's very agreeable work on the honey bee, in which another very striking illustration of the reasoning powers of bees is mentioned. Dr. Bevan says that a friend of his, on inspecting his bee-boxes, perceived that a centre comb burdened with honey, had separated from its attachments, and was leaning against another comb, so as to prevent the passage of the bees between them. This accident excited great activity in the colony, but of what nature could not be ascertained at the time. At the end of a week, the weather being cold and the bees clustered together, it was observed through the window of the box that they had constructed two horizontal pillars between the combs alluded to, and had removed so much of the honey and wax from the top of each, as to allow the passage of a bee: in about ten days more there was an uninterrupted thoroughfare; the detached comb at its upper part had been secured by a strong barrier, and fastened to the window with spare wax. This being accomplished, the bees had removed the horizontal pillars first constructed, as being of no further use. Huber relates an anecdote something similar.

The power which bees possess of ventilating their hives and of producing such a temperature as will prevent the wax from melting in hot weather, is, I think, another proof that something more than mere instinct influences their conduct, as, in their natural state, bees are probably not in so confined a space as they are in our common straw hives, or exposed so much to the heat of the sun. In hot weather, a number of bees (the number probably being regulated by the state of the atmosphere) may be observed busily employed at the bottom of the hive, moving their wings with so much rapidity, that the motion of them is almost imprecepti-ble. If, while this action is going forward, a lighted candle should be held at an opening on the top of the hive, it will immediately be blown out, a fact which will enable you to form some idea of the current of air produced by these insects from the motion of their wings. I have, however, known instances in extreme hot weather, when all the labors of the bees to keep the hive in a proper temperature have failed, and a part of the wax has melted. In this case it is dangerous to go near the hive. The bees are in a state of extreme irritation, and though I fancy that mine know me and receive me as a friend, and allow me sometimes to take liberties with them with impunity, yet, at the time referred to I have suffered from their stings in endeavoring to shelter them more effectually from the heat of the sun.

For the Farmers' Register.

COMMERCIAL REPORT.

November 25, 1833.

There have been few occurrences during the present month that had any important bearing on commercial transactions generally. Such commodities, either of domestic or foreign product, as had previously borne high prices, have in most instances, and as a natural consequence, declined in value. This remark applies more particulaly to cotton, sugar and coffee, but not to tobacco, the crop of which is believed to be small; and as the previous one was very deficient in quantity, it is believed that the stocks of this article in foreign markets will be very light in the course of next year. The planters will no doubt be well remunerated for their present crop and also for the succeeding one. An increase of cultivation will follow of course, and as no increase of consumption has been apparent for many years, the production of one or two large crops will reduce the price from its present rates (extremes $4 50 to $12,) to its former ones of $2 to $8. In this range of prices, the *fancy* tobacco, used by a few manufacturers, is not included.

The confidence which prevailed in Europe and in this country a few weeks ago, that cotton would maintain a very high price, has given way to an almost opposite impression. The injudicious advance is likely to be succeeded by a decline in price, tending to the opposite extreme. Thus far, the highest rate of the present crop in our Virginia market has been 16 cents, and the lowest 13 cents. The depression is caused principally by the belief now entertained that the crop will prove too large for the demand, the general estimate of it being 1,200,000 bales. The very low rates of foreign enchange, the diminished facilities in the negociation of domestic bills, and the pressure for money in our large commercial cities, have also an effect on the prices of cotton and other articles. This effect may be ascertained with more certainty by adverting to the great decline in bank, road, canal and other stocks, in the New York Exchange, many of which are now from 5 to 15 per cent. lower than they were after making dividends in July. Exchange on England, which for several years past was at 8½ to 10 per cent. premium, is now but 5½ to 6, being actually below the par value, taking metallic medium as the standard.

This derangement of money matters grows out of differences existing between the government and the bank. The latter cannot grant its usual facility, because it is in the power of the former to take advantage of any increased issues; and should the bank then be compelled to reduce its discounts, the consequences would be ruinous to its customers. While the United States Bank is thus kept on its guard against runs for specie, the state banks are necessarily obliged to use similar caution, and thus the commercial affairs of the country are straitened, which would otherwise be in the most prosperous condition.

The prices of grain and flour have scarcely varied during the present season. There has been a more limited demand than usual for foreign export; and on the other hand, the surplus beyond the quantity required for home consumption is very moderate. Canal Flour is worth about $5 75—City Mills $6 50—Wheat 112 to 120 cents.

Our merchants are becoming larger ship owners than formerly, and a number of fine vessels are now owned in Petersburg and Richmond. This and the increase of manufacturing establishments are evidences of commercial capital and prosperity.

X.

THE ALBANY ARGUS AND THE FARMERS' REGISTER.

From the Albany Argus.

Having taken some pains to recommend to the notice and patronage of our readers, Mr Ruffin's 'Farmers' Register' of Virginia, we have not been, we confess, altogether inattentive to its progress. It is due to its respectable editor and proprietor to say, that in the character of a publication "devoted to the improvement of the practice, and support of the interests of agriculture," it has fully justified the high anticipations of its friends. In this respect it is all that can be wished; and is admirable both in the matter and the manner. We notice therefore with the more regret any thing in relation to it that will, if persisted in, derogate not only from the impartial and non-political character of the work, but from its general circulation and positive utility. Appended to the fifth number, is the prospectus of a new political paper, to be issued in the city of Richmond by the publisher of the Farmers' Register; and this prospectus is not only a *political tract*, in the ordinary acceptation of the word, but a gross attack upon the administration, and particularly upon Gen. Jackson and Mr. Van Buren, unwarrantable both as to the manner and the facts. It will not be denied, we presume, that the appearance of such a political diatribe, or the introduction of political articles of any sort, in the body of the Register, would be an inexcusable departure from the alleged purposes of the publication, and from the avowals of the editor, expressed or implied, at the start. We certainly do not discover the difference between the circulation of such exceptionable matter in the body of the work, and in pages *precisely similar to the body*, and so directly incorporated with it as to render the dividing line scarcely perceptible even to practised eyes. But we prefer to adopt the language, on this subject, of a correspondent, a highly respectable and intelligent agriculturist of this state, a subscriber if not a correspondent of the Register, and whose attention, we believe, was first directed to it in a letter from ourselves:—"Let me direct you to the latter part of No. 5, for proposals by Mr. R's printer, Mr. White, for publishing a political newspaper decidedly opposed to the present administration. Mr. W. has doubtless adopted this mode to give effect and circulation to his political sentiments. I cannot think Mr. R. was apprised of what was intended to be done. The publisher probably chose, on his own responsibility, to turn an agricultural journal, purely and creditably so, into a vehicle to disseminate political opinions and prejudices. The plea that it was added only as an advertisement, does not meet the objection. The effect of it is as palpable, and as mischievous, as if it had been inserted as a communication in the body of the work. It is exceptionable in any sense."

We have extended these remarks, because we conceive the Register to be highly serviceable to the agricultural interests of the country, and because we are unwilling to see its utility marred by a departure from its legitimate purposes, in furtherance of any scheme of its publisher, political or pecuniary.

The kind and complimentary manner in which the Farmers' Register has been more than once referred to by the editor of the Albany Argus, and the still more marked expressions of favor from a correspondent of that paper, whom we have some reason to consider as the same who now joins in the censures quoted above, induce us to offer some remarks in explanation of the act thus called in question. It accords with our inclination no less than our duty, to hear respectfully, and profit by all friendly strictures. In this case however we have not to apologize for having given just ground for offence, or for a departure from the proper and prescribed course of the Farmers' Register.

The covers of many periodicals are used as vehicles for advertisements and notices, which no one supposes to have been subjected to editorial scrutiny, or even observation, and which have not been considered (it is presumed) by their readers, as having any relation to the works to which they are thus attached. Entertaining this view, we certainly did not expect that it would be necessary to declare that the advertisements on our covers form no part of the Farmers' Register, and have no connexion with its contents, or its objects—and seldom come under our view or notice, except when each number is finished and sent abroad.

When this channel for advertisements was offered to the public, it was not anticipated that proposals for political newspapers might be required to be inserted, and no general rule for their exclusion was either announced or thought of; and of course there existed no sufficient reason for refusing their admission, whatever might be their political or party character, unless indeed, the manner of any such paper was so contrary to propriety and common usage, that any other respectable advertising print would be justified in rejecting it. It is not our business or intention either to defend or condemn the manner or doctrines of Mr. White's prospectus. With its object and purport we have no concern. It is sufficient that it was not considered improper for insertion in some of the most respectable papers in Virginia, and as a matter of voluntary courtesy was published in all the commercial and political prints in Richmond, not excepting the Enquirer. The editors of the Enquirer will certainly not be suspected by the Argus of being partial to the principles and proposed course of Mr. White's intended publication—and the general decorum and propriety of manner, for which that paper is deservedly distinguished, is a sufficient guaranty that a prospectus thus voluntarily published, and widely distributed, was not considered by the editor as contrary to what had been sanctioned at least by common usage. If Mr. White's prospectus, or any other offered for publication, had expressed opinions directly the reverse of those exhibited, it would have been as freely inserted. The most prominent person and the most important of the opinions which it advocates, are as far from having our individual approbation, as those that might be the most pleasing to the Argus. In every point of view, there is as little reason to make us responsible for improper participation in the publication, as to charge the editor of the Westminster Review with the puffs of *Warren's Patent Blacking*, which are so conspicuous on the covers of the English copies of that work.

It does not affect this statement in any way that Mr. White is the publisher of the Farmers' Register, and receives the sums paid for advertisements. The inser-

tion still was made at his cost: and he had an equal right to insert any advertisement that could not have been refused, if coming from another person. The proprietor's interest is but remotely and indirectly concerned in the advertisements, and even the lists of receipts, editorial notices, &c. on the cover, are paid for as are other advertisements.

The Farmers' Register has not been, and shall not be connected in any manner with the support or denunciation of party measures, or individual struggles for office. This course is not more strongly dictated by a sense of duty to our subscribers, and the work we have undertaken, than by feelings of contempt for the game of party, and for those who are the players for personal gain, or aggrandizement. But though *politics* in this sense will receive neither admission nor countenance, there are important political questions which are intimately connected with the interests of agriculture, and which will be discussed in the Farmers' Register freely and fully. To treat of the great interests of an agricultural people, without considering in any manner the influence of laws, and of the policy of the government, would be as great an omission as to treat of tillage, and forget the influence and inequalities of heat and moisture. Whatever measure of government, or operation of law, may tend to the injury of the interests of agriculture, is a proper subject for examination and discussion in an agricultural journal. But so far as it can be done, such discussions shall be confined to their relation to agriculture, and not converted to questions of constitutional law, or used to subserve party or personal views.

This course was indicated in our prospectus, and our opinions on such subjects on all proper occasions will be advanced and maintained without regard to consequences, or to any personal consideration whatever.

REPORT OF SEASONS AND STATE OF CROPS.

The department of "*Agricultural Intelligence*" has as yet been very badly filled, or rather has had no place in the Farmers' Register. We now ask the assistance of correspondents for the purpose of supplying this deficiency. It will serve the interest as well as add to the information of many of our readers, if we can obtain and publish general reports of the weather, and prospects and products of crops in every region of Virginia, or as far as the Farmers' Register may be extensively circulated. There is nothing easier than to be mistaken, on these subjects, and to make incorrect reports, not only from want of accuracy in making observations, but also from extending too generally the particular facts which have been correctly observed. The fear of falling into these errors, from relying on information which was limited and imperfect, has prevented our offering any reports of the kind referred to, but which it is now thought may be easily prepared, and safely and advantageously published, if a sufficient number of our friends will concur in the attempt.

In addition to other obvious considerations, reports of the state of agriculture in every district, from respectable and known individuals, made with as much accuracy as a subject necessarily so uncertain will admit of, would prevent much of the fluctuation of prices which is caused by erroneous views of the effects of seasons and amount of crops, and which is always injurious to both producers and consumers, as well as to the regular trader who deals between them, and is beneficial only to crafty or lucky speculators. The general interest of farmers requires that the prices of their products should be fairly fixed according to the real demand, and not above that rate, any more than below it, on account of mistaken opinions as to the amount of the supply.

For this as well as for other purposes, it is desired that as many of our readers as may find it convenient will furnish concise general statements of the weather, state of growing crops, and the estimated products of such as have been secured, together with any other agricultural intelligence which is worthy of notice, in the particular county or district undertaken by each reporter. In this manner many things interesting to most readers, will be communicated, or commented on, which would have been considered (improperly) of too little importance for independent communications. It will be proper that every statement of facts intended to form part of these reports, should be accompanied by the author's name: though unless sent in the form of a regular communication for the Farmers' Register, the name will not be published. It will, however, be desirable that each one who may propose to correspond with us for this purpose will permit the use of his initials, or some other letters as a signature, and as a uniform designation for the same person.

It will be most convenient and proper for these reports to be published quarterly. The number for January (if our proposal is approved and seconded,) may contain the report of the weather, and of general operations for the preceding three months, embracing the sowing of wheat, and the harvests of corn, tobacco, cotton, &c. with any general remarks on the whole preceding year, which will most properly belong to the report of the last quarter. In April, it might be stated in what manner the various preparatory labors, which belong to the first quarter of the year, had been either favored or retarded by the weather, and its general influence on the prospects of crops. The report for July would embrace the important harvests of hay, wheat, oats, &c. and that of October, the then known results of those crops, and the prospects of all others then standing on the land.

It is always most agreeable to publish whatever may be communicated in the language of our correspondents. But if any do not choose to furnish more than materials for constructing a report, that aid will be not the less welcome. Indeed, no report of the kind contemplated can be expected to owe much of its value to its form and style. The materials will necessarily be received late in the quarter, and must be put together in haste. We shall use the whole, or only extracts of separate communications—the substance, only, when the same general statements have several authors—or both the words and matter, when the case may require it. In short, as the whole scheme is an experiment, the means for conducting which must be furnished by others, we can only now state what we wish, and not what *will be* performed.

Of course the aid we ask will be acceptable from any

and every quarter: but more particularly it is requested from our many intelligent subscribers who have heretofore furnished nothing to our pages. Among them there are many not only qualified for these humble services, (which indeed require nothing but habits of observation and correct statements of facts,) but for those of much higher order, who, because farming is not their most important pursuit, deny that they can aid an agricultural journal with their pens. To professional gentlemen, and particularly to members of the bar who practice through a country circuit, it will be easy to collect the information desired, and still more easy to communicate the results. We hope that many will in this manner aid our work, by reporting any information that may be collected within any certain named limits, as a senatorial district, or a single county. Any communications for this purpose must be transmitted in the course of the month preceding the quarterly publication, and of course in December, for the report to be made in the beginning of January.

MR. HERBEMONT'S GRAPE VINES.

We request the attention of such of our readers as may wish to form vineyards, to the advertisement of Mr. Herbemont on the cover of this number of the Farmers' Register. His offer to send vines for sale to Richmond has been thus made partly upon our suggestion, and we will be glad to convey to him any orders, as a small return which we, in common with the agricultural interest in general, owe for his services to the cause of agriculture. Mr. Herbemont has long been advantageously known for his zealous efforts to improve the grapes of our country, and the culture of the vine has been thereby greatly improved and extended. Like most other pioneers in pursuit even of greatest general utility and profit in after times, his many experiments will give their beneficial results to thousands, while he alone will sustain all the loss inseparable from such a course—and before his sales had been commenced, he had gratuitously and widely distributed the plants which he had either first introduced, or of which he had proved the fitness for our climate.

TERMS OF THE FARMERS' REGISTER.

The FARMERS' REGISTER will be published in monthly numbers, each to contain 64 pages, large octavo, at $5 a year.

Payments for subscriptions may be made to the editor, and at his risk, through the mail.

Any person who shall hereafter procure four new subscribers, and transmit their first year's subscription with their names, shall receive a fifth copy of the Farmers' Register for the current year, without additional charge. If fewer than four subscriptions are sent at any one time, and the extra copy is intended to be claimed when that number shall be completed, such intention must be expressed at first, or the claim will not be admitted.

No subscriptions will be permitted for less time than a year: nor will any be discontinued unless directed by the subscriber—nor while any thing is due thereon, unless at the choice of the editor.

EDITOR'S ADDRESS.

All papers, letters and communications relating to the Farmers' Register, must be addressed to Edmund Ruffin, P. M. Garysville, Va.

It is again earnestly requested that this often repeated address may be always used, as the direction to Richmond of letters to the editor, continues to cause much delay and trouble, as well as additional expense in postage.

TO CORRESPONDENTS.

Communications on *Encouragement of Agriculture by the Legislature*, on the *Culture of the Vine*, and on *Different Varieties of Grapes, &c.* have been received, and will be published in our next number.

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